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NOTICES.—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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Waste Gases from Sulphate Plants

IN the report which the Chief Inspector under the Alkali Acts recently issued for the past year attention was drawn to the fact that in some instances inadequate precautions are taken in so far as the treatment of the waste gases from sulphate of ammonia stills is concerned. In nearly all cases in which the Alkali Works Inspectors found it necessary to interfere the trouble seems to have been due to the use of defective oxide of iron purifiers, and it would seem that this convenient method of effecting treatment is still by far the most commonly employed. The oxide heap is, of course, a survival of the very earliest days of the working-up of ammoniacal liquor, but in spite of its simplicity if properly attended to it is a matter for surprise why at any rate some of the larger producers of sulphate of ammonia have not adopted the system which embodies the use of miniature sulphuric acid plant. It is, perhaps, not generally known that the sulphur dioxide resulting from the combustion of sulphuretted hydrogen can be comparatively simply converted into sulphuric acid irrespective of there being a distinct unit for the manufacture of the latter adjacent to the sulphate plant.

In his recently published book on *The Design and Working of Ammonia Stills*, Mr. Parrish draws attention to the fact that there are one or two peculiarly simple forms of sulphuric acid plant which can be advantageously adopted for producing this acid from saturator waste gases, and he gives details of an arrangement which, apart from being inexpensive, is particularly flexible and more or less "foolproof." The arrangement comprises a burner for the combustion of H_2S, the burner gases being subsequently cooled in specially designed SO_2 coolers. Following the coolers is a Kestner fan which not only introduces the necessary air for combustion under suction, but delivers the partially cooled burner gases under positive pressure to a series of bubbling tanks which contain nitro-sulphonic acid of a well-defined strength. By reason of the intimacy of contact between the sprayed nitrous acid and the sulphur dioxide, rapid reaction occurs with the formation of sulphuric acid. If desired, both Glover and Gay-Lussac towers may be interposed, but these are by no means essential, as the bubbling boxes may be made to serve the purposes of the towers. It is particularly interesting to note that a plant of the kind can be operated at the phenomenally low capacity of less than 1 cubic foot of chamber space per lb. of sulphur per twenty-four hours, the only matter of importance being that of ensuring an excess of nitro-sulphonic acid. Mr. Parrish states that where it is desired to produce sulphuric acid at a low cost from waste gases a plant of this kind is peculiarly satisfactory, and one would judge that the only limiting factor is the size of the sulphate of ammonia unit, for obviously the process would not be commercially feasible for many of the small units which are in operation in this country.

The Storage of Cyanamide

ONE of the first points of importance in connection with fertiliser materials, a point which is so frequently disregarded, is the effect which prolonged storage may have upon the efficiency of the substance. With the staple forms of fertilisers, such as are most commonly employed in this country, the effect of deterioration is of no account, and it might almost be said that storage under correct conditions has a helpful rather than adverse influence on quality. The question, however, begins to assume considerable interest when one comes to consider a material such as calcium cyanamide, for it has been shown that when this compound is exposed to the atmosphere it absorbs moisture and carbon dioxide with the result that the nitrogen, which is originally present largely as cyanamide nitrogen, is partially changed to other forms. The extent of this decomposition is dependent upon conditions of storage as to temperature, humidity and length of storage, and as to whether the calcium

cyanamide has been hydrated and oiled. In addition to nitrogen loss, there is the outstanding point that certain chemical changes occur under different conditions, and it is essential that we should be in possession of a thorough knowledge of the changes in properties which take place as a result of these chemical modifications.

Three American workers of the Fixed Nitrogen Laboratory at Washington have just communicated to the *Journal of Industrial and Engineering Chemistry* the results of a study of the nature and extent of the decomposition of calcium cyanamide under various storage conditions which has occupied them well over two years. The investigation and the conclusions to which it has led are of more than ordinary interest for the reason that previous statements have been more or less conflicting, a state of affairs which may be ascribed in part to the lack of adequate analytical methods, and to the fact that, with a few exceptions, the experiments have been made on only a few grams of material. The recent American work has, however, been conducted with batches of material representing comparatively large commercial quantities. Indeed, a study was included of the chemical and physical changes occurring in the cyanamide stored in silos containing about 450 metric tons at Muscle Shoals. It is information relating to bulk storage of this kind which is of such considerable importance, and the valuable conclusions which may be drawn from the American investigation show in the main that (*a*) the greatest losses of nitrogen occur in the first 10 cm. of material where the maximum quantities of water and carbon dioxide are absorbed, (*b*) the loss of nitrogen progressively decreases with increasing depth in the material, (*c*) loss of nitrogen appears to occur in two stages—namely, a slight loss when the freshly prepared material is first placed in storage (probably due to the action of moisture on traces of easily decomposable metallic nitrides) and further losses occurring as calcium cyanamide decomposes probably due to the hydrolysis of urea. A useful moral may be readily drawn from these conclusions—namely, that storage receptacles should be so designed that the least possible surface area of the cyanamide is exposed to the effects of the atmosphere.

The Formaldehyde Report

THE Ministry of Health should have no difficulty in acting on the report of the expert committee, a representative and extremely well qualified body, which, after a very full inquiry recommends that the addition of formaldehyde or any of its derivatives to food or drink should be absolutely and specifically prohibited. Formaldehyde is described in the report as a substance "inimical to life and to vital processes of all kinds," and as "a powerful protoplasmic poison." Its action as an irritant poison is the more dangerous because it is "probably cumulative," and its conversion from a latent to an active condition may bring stored-up small quantities of the poison into sudden co-operative action, with very serious effects. Apart from the fact that it is itself a poison—which in any case should be conclusive—there is the further objection to this as to all chemical "preservatives" that, instead of really preserving food or drink in a wholesome state, they may merely conceal their unwholesome condition, particularly in the case of meats, and thus induce a false sense of security on the part of the consumer. The real remedy in the case of all foods lies in freshness and cleanliness. These are the natural guarantees of fitness, and where they fail it may safely be assumed that the substance is unfit for use. The committee has specially considered the Linley process, designed to enable chilled beef to be treated with formaldehyde for purposes of shipment, but sees no reason for excluding this process from its general judgment against the use of formaldehyde. In this case trade opinion coincides with the scientific findings, and there is no apparent obstacle to the speedy enforcement of the committee's recommendation as a legal regulation.

Chemical Plant Progress

THE address of the retiring chairman (Mr. L. M. G. Fraser) at the annual meeting of the British Chemical Plant Manufacturers' Association is an unpretentious but really rather remarkable summary of the improvements and developments in chemical plant design and construction which have taken place in modern times. The improvements are broadly classified as better products obtained, lower working costs, cheaper apparatus, and safer operations. One example mentioned, which may be taken as typical of others, is that while formerly only half a ton could be obtained from grinding plant with certain materials per given horse-power, to-day five or more times that amount can be turned out per hour with no more power absorbed and less wear and tear on the plant. The demands on modern chemical plant are very much more severe than in former days, and the chemical plant builder, in addition to being a general engineer, has to be a highly-trained specialist if he is to be able to meet all the requirements of the chemist to the utmost of the knowledge at present available. The list of operations and problems, as mentioned by Mr. Fraser, with which the chemical plant manufacturer is concerned, makes up a rather striking catalogue, and the manufacturers are on right and progressive lines in considering them co-operatively, instead of working in isolation. Among the practical duties suggested by Mr. Fraser for immediate or early attention is the preparation of a new directory, and the issue of a list of alloys with their qualities as regards physical conditions and resistance to corrosion.

Solving the Nitrogen Problem

THE war undoubtedly gave the necessary stimulus required for the development of nitrogen fixation industries in various countries, but since the war, although the necessity of building up independent supplies of combined nitrogen is widely recognised, the actual results achieved in different countries have been strangely at variance.

In Germany the full development came with the war but in other countries only a start had been made when the war ended. In this country the work of investigation was undertaken by the Nitrogen Products Committee, but the results obtained were quietly made over to private enterprise as soon as it was obvious that nitrates would not be needed for immediate war purposes. Private enterprise has gone ahead, over-

coming immense difficulties, and on Christmas Day last year the synthetic ammonia plant at Billingham commenced operations, and is now turning out over 100 tons of ammonia per day. The contrast between this achievement and the present position in the United States is remarkable, and for once this country is well in advance. The Americans planned an enormous nitrogen fixation scheme at Muscle Shoals in connection with hydro-electric power developments on the Tennessee River, but according to latest reports the fate of this splendid plant is still in the balance. The question of who is to have the privilege of working it has assumed political importance, and the complicated series of offers by Henry Ford and other parties has become much too involved for us to follow in this country. Eventually, after much waste of time and money the matter will doubtless be decided, but at present it stands as an example of the dangers liable to arise when governments interfere in industry. In France, on the other hand, the govenrment has contented itself with giving only a little encouragement, and securing the rights of the Haber process for private enterprise, with the result that, according to the latest information, plants for synthetic ammonia production, both by the Haber and Claude methods, are growing up in various places, and French interests are even engaged in laying down plants in Belgium and Spain.

"Wanted"

ON July 5 an advertisement for two junior chemists with metallurgical experience appeared in THE CHEMICAL AGE. The order, duly signed and posted from an address in Salisbury, had all the usual evidences of authenticity, and was prepaid. Within a week or so forty-two applicants from various parts of the country had applied for the posts. It came to our knowledge, through letters and through advices from the Institute of Chemistry, that the advertiser had written to several of the applicants offering them the appointment, and asked them, if they accepted, to forward him a fee of one guinea. The proprietors of THE CHEMICAL AGE at once communicated with Scotland Yard, with the result that the advertiser was found by the police with envelopes containing eight guineas in his possession. So prompt was the action taken that although forty-two replies were received, the advertiser had been unable to use any of the money posted to him. On a charge of obtaining money by false pretences, he pleaded guilty, but in view of appeals on his behalf and testimony to his past good conduct, he was treated under the First Offenders Act and not convicted. It turned out that he was engaged in bio-chemical work at a military experimental school, and it was his Commanding Officer who successfully pleaded for a lenient view of the lapse, which was attributed to monetary difficulties. While the Bench's action must no doubt be accepted as right, it is a satisfaction to have been able, with the co-operation of the Institute of Chemistry, to detect and stop the scheme so promptly as to prevent any loss to the applicants who replied to the advertisement. The complainants who appeared in the case were Mr. Cyril Arthur Wall, assistant chemist, of Cwmbran, Monmouthshire, and Mr. Reginald William Payne, B.Sc., chemical student, of Loughborough.

The A.C.S. and British Chemists

THE annual meeting of the American Chemical Society is organised on lines not unfamiliar in this country, being held this year in the Cornell University at Ithaca, New York State, from September 8 to 13. The Society is thus the guest of the University and a week is spent listening to addresses, visiting laboratories and places of interest, and in social functions. The president this year is Professor Leo H. Baekeland, but the point of greatest interest for English chemists in connection with this year's meeting is that among the various names in the programme of speakers there appears one of our great leaders in chemical industry, Sir Max Muspratt, and one of our prominent chemists, Sir Robert Robertson. Sir Max Muspratt has chosen for the title of his address the general and comprehensive one of "Chemistry and Civilisation," and he will no doubt have something to say about the part played by that fundamental chemical industry with which he is connected—the alkali industry—in the development of our modern life. Sir Robert Robertson's paper on "The Chemistry of the Trinitrotoluenes" will be of a more technical nature, and he will doubtless interest American chemists with some account of the researches done on TNT here during the war.

Points from Our News Pages

A review of recent developments in chemical pharmacology is made by G. Malcolm Dyson, B.Sc. (p. 158).

Letters are published from J. Gilbert ("Water softening by 'Doucil'") and George Valentine ("The late Sir G. Beilby") (p. 160).

In a paper by M. Urbain on "Debenzolising coal gas by solid adsorbents," presented to a gas conference in Paris, reference is made to the comparative uses of activated carbon and silica gel (p. 161).

A fine of £50 on each of two charges for making false declarations of value for Customs purposes was imposed on Wednesday on Mr. A. S. Henry, a London chemical merchant. Notice of appeal was given. (p. 162).

At the annual meeting of the British Chemical Plant Manufacturers' Association the retiring chairman (Mr. Fraser) reviewed recent advances in chemical plant design and construction (p. 164).

A departmental committee of experts has reported strongly against the use of formaldehyde or any of its derivatives as a preservative for food and drink (p. 166).

Correspondence has taken place between the Chemical and Dyestuff Traders and the Board of Trade respecting the effect on British export trade of high shipping freights (p. 167).

Summaries are published of several chemical papers at the British Association meetings in Canada (p. 168).

The London Chemical Market continues fairly steady (p. 175).

The Scottish Chemical Market remains quiet (p. 178).

Books Received

THE THEORY AND APPLICATION OF COLLOIDAL BEHAVIOUR. Vol. I, Theory. Vol. II, Application. By Robert H. Bogue. New York and London: McGraw-Hill Book Co., Inc. Pp. 830. 40s.

FISHES THE SOURCE OF PETROLEUM. By John Muirhead Macfarlane. New York and London: The MacMillan Co. Pp. 451. 25s.

The Calendar

Sept 4–5	Iron and Steel Institute Autumn Meeting	British Empire Exhibition, Wembley
8–11	Institute of Metals	London
8–13	Chemists' Exhibition	Manchester
Nov. 14	Society of Chemical Industry: Annual Autumn Dinner	London

Recent Developments in Chemical Pharmacology

By G. Malcolm Dyson, B.Sc.

In the following article the author reviews the recent work that has been done on the relationship between the chemical constitution and the therapeutic effect of various drugs.

MEDICINE is gradually changing from an empirical art into a state where the advancing applications of chemical and physicochemical considerations are bringing it to the rank of a more or less exact science. The crude and inefficient vegetable remedies of our predecessors are being supplemented at every turn by synthetic products from the laboratory, and in many cases where drugs suitable for a specific purpose were not available, the chemist has introduced synthetic substances to fulfil a given purpose with the most successful results.

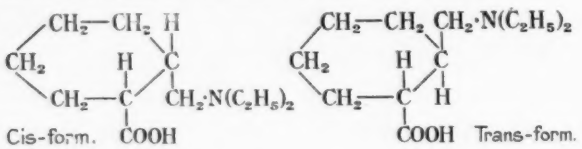
The relations between the constitution of a drug and its physiological action are of paramount importance in the synthesis of new drugs; but these relations are far more complicated than the already complex relations of colour and constitution, and we can only consider here those guiding principles which have led to the more recent development of the subject.

In the first place it is to be remembered that every drug is, at the same time, a poison, and that it must be used with care and discretion, so that the maximum therapeutic effect is realised with the minimum of toxicity. The efficiency of a drug can be measured by means of the so-called "therapeutic ratio." This is given by :—

$$R = \frac{\text{Minimum dose to produce fatal results.}}{\text{Minimum dose to produce curative results.}}$$

Thus, when the value of R is high, we have a "safe" drug, and one that can be used with impunity in general medical practice, while as R approaches nearer to unity the drug becomes more dangerous to handle and of less use to medical science.

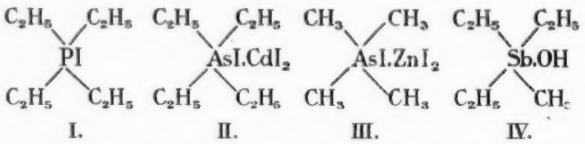
With regard to the general relations of pharmacology to chemical constitution, we have to bear in mind that the smallest change in the chemical constitution of a drug may be accompanied by an extremely large change in its physiological activity, and, in point of fact, many substances which differ only in their optical activity exhibit differences in physiological action. Thus for instance, dextro-asparagine has a sweet taste while laevo-asparagine is insipid, and hyoscyamine, a laevo-rotatory substance, is twice as active on the heart, as atropine its racemic isomer. A large amount of evidence has been accumulated which conclusively shows that in cases where a compound can be resolved into two stereo-isomeric forms, the two forms usually differ in physiological activity. Again, the "cis-trans" form of isomerism may be responsible for differences in physiological activity. Thus, for instance, maleic acid is a stronger poison than fumaric, and in the case of the hexahydro-o-diethylbenzylamine carboxylic acids the cis-form has a stupefying odour while the trans-form is odourless :—



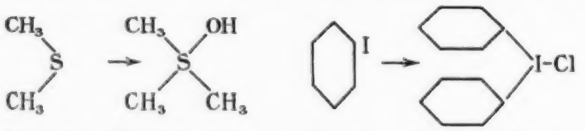
The consideration of the specific action of certain chemical changes on pharmacological action, is best dealt with in the sections :—

(1) Methylation.
(2) Esterification.
(3) Introduction of sulphonic or carboxyl groups.
(4) Unsaturation.
(5) Lengthening of the carbon chains.
(6) Introduction of organo-metallic groups.

The methylation of a tertiary base to give a quaternary ammonium base is always characterised by the curare-like action of the quaternary compound. This is seen in the case of curine, which is the tertiary base corresponding to curarine, and is not very poisonous. On methylation it gives the quaternary base curarine, which is some 230 times as toxic as curine. The inevitable appearance of the curare-like action in the quaternary ammonium bases has been very closely investigated, and the conclusion reached is that the change in physiological activity is due to a change in the stereo arrangement of the nitrogen atom. The fact that addition to the nitrogen induces so fundamental a change must be due to a stereochemical change, since Vulpian has shown that the phosphonium, arsonium, and stibonium bases show a similar effect. He prepared the compounds :—

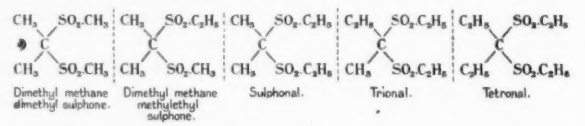


I. Tetra ethyl phosphonium iodide. II. Tetra-ethyl arsonium cadium iodide. III. Tetramethylarsonium zinc iodide. IV. Methyl triethyl stibonium hydroxide, and found that in all cases the curare effect was developed. The probable explanation is that in the change from the trivalent to the pentavalent state, the nitrogen, phosphorus, arsenic, etc., changes its plane arrangement to a three dimensional arrangement. This is supported by the fact that not only has optical activity been observed in pentavalent nitrogen compounds, but that an entirely analogous set of phenomena has been observed in the case of certain iodine and sulphur derivatives. Thus, for example, the comparatively harmless dimethyl sulphide, when converted into trimethyl sulphine hydroxide, develops

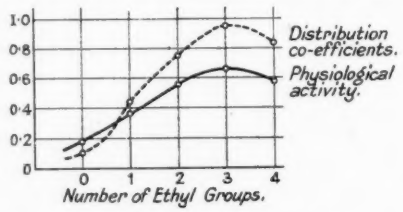


a curare-like action, as does phenyl iodide by conversion to diphenyl iodonium chloride. Both tri-methyl sulphine hydroxide and diphenyl iodonium chloride have been resolved into optically active components.

The solubility of a compound, especially the distribution coefficient between lipoid matter and water, has a considerable effect on the physiological character of a drug. The following series of compounds :—

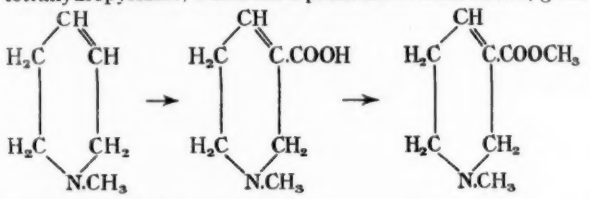


have solubilities which increase in the same way as the physiological activity. In the curve below the distribution coefficients between fats and water of these compounds are plotted against the number of ethyl groups, and on the same diagram



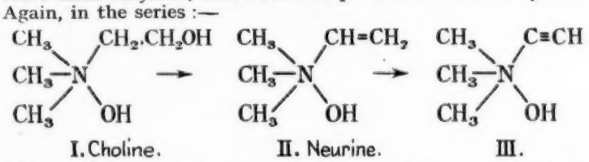
the variation of physiological activity with the number of ethyl groups is plotted, and the two curves show conclusively that there is an intimate relation between the distribution co-efficient and the activity.

This relation is general among anæsthetic substances, and it follows as a consequence that the introduction into a compound of groups which alter its distribution coefficient will alter its physiological activity also. Thus the introduction of a sulphonic or carboxyl group is usually attended with an increase in the solubility in water and a decrease in the activity. Thus morphine-sulphonic acid has an extremely mild action on the human system, and can be tolerated in doses of several grams. In some cases where the presence of an acid group weakens the activity of a compound, the esterification of the acid group will restore the activity. Thus *N*-methyl-tetrahydropyridine, which has a pronounced toxic action, gives

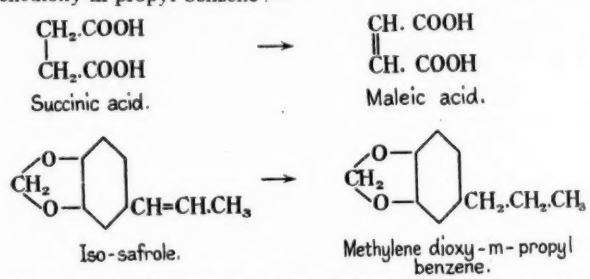


by the introduction of a β-carboxyl group arecaidine, which is without action on the human system. The methyl ester of this compound, arecoline, has an action very similar to that of pilocarpine or muscarine, while cocaine, the methyl ester of benzoyl ecgonine, is about twenty times as active as the base containing the free carboxyl group.

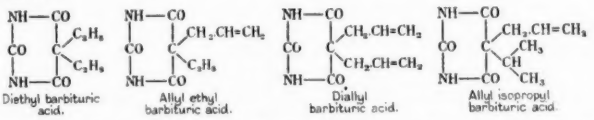
The effect of unsaturation, in the majority of cases, is to increase the activity, or to accentuate some aspect of the activity of a compound, and in this respect the triple bond is more efficient than the double bond. Thus, methane is less toxic than ethylene, and both less poisonous than acetylene. Again, in the series :—



which has recently been investigated, choline is only slightly toxic, while the compound neurine with the corresponding unsaturated side chain is a toxic compound of the same order as strychnine, and the compound III. with the corresponding acetylenic linkage is still more toxic. Yet again, succinic acid is harmless while maleic acid is an active poison, and it has been recently demonstrated that iso-safrole is far more toxic than the corresponding saturated compound methyl-enedioxy-m-propyl benzene :—

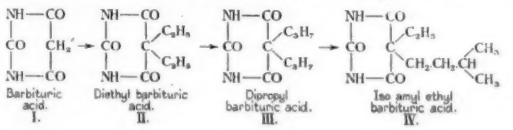


The constructive use of this principle is shown in the elaboration of a series of compounds recently introduced as hypnotics. The starting point, veronal or diethylbarbituric acid, has certain disadvantages, including a low therapeutic ratio.



It was found that while the introduction of one unsaturated group—the allyl group—improved the efficiency of the drug, the introduction of two allyl groups developed certain new but undesirable characteristics. Detailed research elucidated the fact that the most suitable compound for use in this respect was allyl-isopropyl barbituric acid.

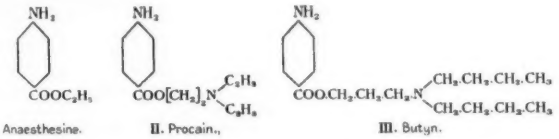
In this connection there is a well-marked relation between the lengths of the carbon chains and the activity of the compound. In certain exceptional cases—*e.g.*, the aliphatic alcohols—the lengthening of the carbon chain decreases the solubility, and thus lessens the physiological activity. However, in the majority of cases the lengthening of the carbon chains is attended by an increase in the activity of a drug. In the series



it was found that a regular increase in hypnotic action was observed as the hydrogen atoms in the methylene group of barbituric acid were progressively replaced by ethyl and propyl groups.

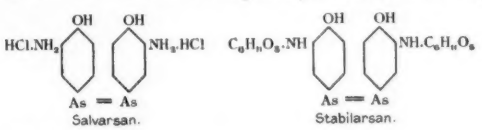
The branching of a carbon chain diminishes its activating power. Thus iso-alkyl compounds are often less active than normal alkyl compounds—a fact that has been utilised in the synthesis of compound IV above—iso amyl ethyl barbituric acid, which has been successfully introduced as a safe hypnotic and sedative within recent years.

The most striking triumph of the application of this principle of carbon-chain elongation is in the synthesis of the local anæsthetic " Butyn."



The research work culminating in this discovery was based on an observation by Einhorn that the ester of para-amino benzoic acid, better known as anæsthesine, has a local anæsthetic action on abraded skin surfaces. By preparation of a long series of compounds, " Procain " was arrived at, which possessed the desiderata of a local anæsthetic to a high degree. The fact remained, however, that " Procain," in common with other local anæsthetics, failed to anæsthetise the tongue and mucous membranes of the mouth, but by elongation of the carbon chains as shown in compound III above a local anæsthetic " Butyn " was obtained which effectually produced the required anæsthesia of these membranes.

In the treatment of disease of protozoal origin, such as syphilis, sleeping sickness, malaria, etc., the introduction of organo-metallic residues, especially of mercury and arsenic, has been attended with great success. The aim in this case is to introduce the metallic residue into the system in such a way that the specific micro-organisms of the disease are attacked and destroyed, while the host is untouched. The celebrated researches of Ehrlich, culminated, as is well known, in the introduction of diamino-dihydroxy-arsenobenzene hydro-



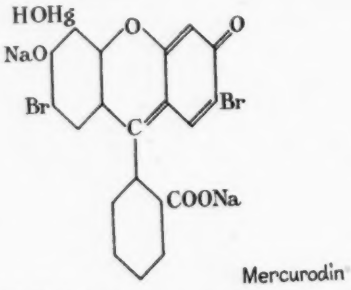
chloride, or salvarsan, as a specific for this type of disease, but although efficient, the technique of administration left much to be desired, and recent research has been directed to overcome these defects. The chief drawbacks to the use of salvarsan are :

(1) It must be preserved in an inert atmosphere.
(2) Before use it must be accurately neutralised with pure caustic soda solution.
(3) The solution so prepared does not " keep."

Research has shown that the introduction of a glucose residue into each of the amino groups stabilises the compound and gives a specific which is without the disadvantages mentioned above. The compound " Stabilarsan " (see above) is stable,

both solid and in solution, and requires no neutralisation before use.

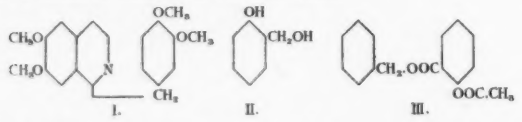
Admirable as these compounds are in the destruction of micro-organisms in the blood, they lack the power of penetration into the deeper tissues, and for this purpose it has been found that the organo metallic compounds with mercury in the place of arsenic are recommended. It is a singular fact that the constitutions of the organo-mercury compounds most useful in this direction are extremely similar to those of certain dyes. Thus "Mercurodin"



Mercurodin

is a compound that is at the same time a dye stuff and an organo-metallic anti-syphilitic. It has been suggested that the efficacy of this and similar compounds is due to the "anchoring" effect of the "dyestuff" part of the molecule.

With regard to the nature of pharmacological action, the facts that stand out are, that not only do relations between the action of a drug and its chemical constitution exist, but that such relations are in many cases traceable to the presence of some specific grouping. Thus in the case of papaverine, the activity is due in the main to the benzyl grouping, and that the presence of the other groups only modifies to a certain extent the properties of this alkaloid. Thus it has recently been shown that the simple alcohol has a similar sedative action to papaverine, while benzylacetyl salicylic acid is the most suitable of a long series of compounds investigated.



I. II. III.

Although the therapeutic action of a compound is in many cases traceable to the presence of some characteristic grouping, in the present state of our knowledge of the subject—in spite of the increasing research therein—the modifying effect of small structural changes is so great that we cannot accurately forecast the therapeutic properties of an unknown compound from an inspection of its structural formula. The chemical and physical factors at the root of drug-action are obscure—the more so as the substrate on which they act—the various cells of the body—are of a vague and doubtful chemical nature.

Nevertheless, this aspect of chemical pharmacology is receiving considerable research-work in various directions, and while the advance of technique is tending to put the subject on a sounder basis, there can be do doubt that a systematic chemical study of the relation of the pharmacology of drugs to their chemical constitution is proving an effectual weapon in modern medical progress.

Increased Carbon Black Production

We are informed that J. M. Huber, Inc., is constructing a new carbon black plant at Breckenridge, Tex., embodying the most recent scientific developments in that industry. The plant is designed to utilise the modified Huber channel process, which has been adopted by a number of the Louisiana manufacturers, including the large Huber plant at Swartz, Louisiana. The new plant will be equipped with the air-floating process of refining which was perfected by this company last year after a long development period. "Aerfloted Arrow Black" has found an active demand from the tyre industry, making it necessary to increase production. The Huber Co. has now become one of the largest producers of carbon black, having followed a progressive expansion policy for the past few years.

Water Softening by "Doucil"

To the Editor of The Chemical Age.

Sir,—We, in Australia, are unfortunate in being so thoroughly detached from the real fountains of knowledge, since information concerning progress in scientific thought must necessarily be culled from journals sometimes three months old.

Thus, I beg to be excused for having to refer to your issue of March 1, 1924, which contains a report of the joint meeting of the Institution of Mechanical Engineers and the Chemical Engineering Section of the Society of Chemical Industry, when Messrs. Hilditch and Wheaton read a paper on "Softening Water by Means of 'Doucil.'"

When the results of philosophic inquiry are published, as in this case, I believe it is customary to acknowledge the work of contemporaries, particularly successful researches in the initial and intermediate stages. Yet we find Messrs. Hilditch and Wheaton benevolently imparting information on the production and application of new compounds of great economic value, but failing to state who really was the first worker systematically to produce those compounds and demonstrate their wonderful efficiency.

All this work was completed before Dr. Hilditch had acquired an intelligent interest in the matter, and therefore unable to apply his extensive knowledge of surface action. I am sure that Dr. Hilditch and Mr. Wheaton made the omission inadvertently, and will not delay in making due acknowledgment.—I am, etc.,

J. Gilbert.

"Lancastria," Prescott Terrace, Rose Park,
Adelaide, South Australia.
July 8, 1924.

The Late Sir George Beilby

To the Editor of The Chemical Age.

Sir,—Please excuse me for drawing your attention to a slight mistake in your particulars of the late Sir George Beilby where you state, "In 1881 he patented, together with Dr. James Young, a vertical retort," etc. This should be with the late William Young, who was at the Clippens Oil Works (by Paisley) and Sir George, then Mr. G. T. Beilby, was chemist at the Oakbank Oil Works, and the writer was works engineer at Clippens Oil Works. Both were then experimenting with the black spent (oil free) shale which was then being discharged from the 10 ft. to 12 ft. high retorts, to find out the best way to treat it so as to liberate the carbon combined nitrogen as ammonia. To do this it was found necessary to have a much higher retort, 30 ft., so as to submit the red-hot black (oil free) spent shale to an atmosphere of steam before being discharged from the bottom of the retort. Then the steam was decomposed as the oxygen consumed the carbon and the nascent liberated nitrogen combined with the hydrogen to form ammonia as required. The excess of steam protected the ammonia from decomposition as it passed up through the retort. The spent shale discharged was of a grey colour. The writer made a drawing of this retort for Mr. William Young at his private residence at Peebles and subsequently saw it through the Patent Office at Glasgow. This retort (the Young and Beilby retort), as stated, gave fresh life to the shale industry. More could be said, but I think this short explanation is necessary.—Yours, etc.,

Geo. Valentine, F.C.S.,
Engineer and Chemist.

13, Farm Avenue, Streatham, S.W.16.
August 9.

Hints on Working Aluminium

In the series of "Aluminium Hints Booklets," issued by the British Aluminium Co., Ltd., of 109, Queen Victoria Street, London, E.C.4, data upon the properties and working of aluminium is coupled with tabular matter sectionalised according to the form of metal under review. Booklet No. 2A (new series), just issued, treats of aluminium sheet, strip in coil, and circles; it includes in its data hints on temper, press work, metal beating, spinning, jointing and finishing. As in the earlier issues, the booklet is of pocket size for handy reference.

Debenzolising Coal Gas by Solid Adsorbents

Activated Carbon and Silica Gel

By M. Edouard Urbain

During the annual meeting in Paris recently of the Société Technique de l'Industrie du Gaz en France, M. Urbain, in a paper on "The Debenzolisation of Coal Gas by Solid Adsorbents," referred to the comparative uses of activated carbon and silica gel. A summary of his paper is given below.

M. URBAIN gave a sketch of the history of debenzolising in France, culminating in the law of July 23, 1923, according to which in any new agreement the heating value of the gas is not to exceed 504 nor fall below 392 B.Th.U. per c. ft., and the undertaker may be held bound to recover products valuable for industry or for national defence. It was not thought possible to go farther than this, because there was a lack of debenzolising processes applicable to medium and small works. In 1923 the only processes in use were scrubbing processes; but since then adsorption by solids has attracted much attention.

Scrubbing Processes

In the United States, heavy petroleum oil, 250° to 350° C., was used; in Europe, almost exclusively heavy tar oils, 200° to 350° C.; Lyons, medium phenol oil; Paris, clear anthracene oil. M. Grebel had shown that all these oils failed to take up more than 2 to 3 per cent. by weight of benzol; and this involved heavy expenditure of steam; besides, the cooling had to be effective, for the solvent power fell off rapidly above 15°-20° C. M. Brégeat introduced cresol oils containing the three isomeric cresols, together with a little phenol; these oils would take up 6 to 8 per cent. of benzol, but their boiling point was between 185° and 203°, which was inconvenient. The washing oils ought not to evaporate at all into the crude benzol distilled off from them; but this was not feasible, and the treatment of the crude benzol was a bother. Besides, the phenols oxidised, and the solvent power fell off, not to mention the production of emulsions. Generally, scrubbing was only applicable in large works; even central treatment of charged heavy oils encountered an invincible obstacle in the prohibitive cost of carriage.

Experience with Activated Carbon

During the war much use was made of adsorbent carbon for gas masks, and types of active carbon were evolved. In Germany the Bayer colour works applied the idea to the recovery of hydrocarbons; but its mode of making the active carbon was kept secret. In America the only active carbon available had been cocoa-nut carbon, which was scarce. M. Chaney had put forward processes of selective oxidation for activating carbon which were said to be a success; but for the higher activations the cost mounted high. In August, 1923, there were nine works in the United States using activated carbon of a medium activity for the treatment of about 70 million c. ft. of natural gas per diem, and twelve other works under construction for the treatment of 176 million c. ft. per diem.

The author had been carrying out investigations for the Paris Gas Company, and facilities had been given at Grenoble, where the make of gas is from 264,000 to 528,000 c. ft. per diem. The mechanism of adsorption was unknown; but a good deal was now known as to its conditions. Adsorption was always associated with the liberation of heat; so that on separating the hydrocarbons from the solid adsorbent, it was necessary not only to provide heat for the evaporation of the hydrocarbons but also to restore the heat lost during adsorption; and, further, it had to be seen to that the liberation of heat did not injuriously affect the adsorption. Again, the active carbon had a selective action, different for the different gases or vapours. If coal gas be passed through three successive columns containing the carbon, the naphthalene was retained in the first and the products from the third had a smaller density than those from the first and second columns.

The use of carbon in flakes or too small in the grain at first led to considerable resistance; but with grains of sufficient size, such as did not give rise to sinking of the layer, it was found that with a layer 44 in. deep on an area of about 10 sq. ft. the losses of pressure were: for 35·3 c. ft. per minute, 0·16 in.; for 70·6, 0·32 in.; for 106, 0·52; for 141, 0·74; for 176·5, 1·00; for 222, 1·26; for 247, 1·56; for 282 c. ft. per minute, 1·84 in.

Consumption of Steam

The specific heat of carbon was low; so no great quantities of steam were required, provided always that the whole heat of the steam was utilised. If the steam came in direct contact with the charged carbon, only the superheats could be utilised, because wetting by condensed steam was fatal to the adsorbent power. The author used indirect heating for heating up the mass to 100° and only then introduced superheated steam directly. At Grenoble, with plant of 42 c. ft. capacity, the use of this sequence resulted in a consumption of from 2·3 to 2·8 cwt. of steam per operation; this corresponded to about 3 lb. of steam for every 1 lb. of benzol recovered. The mass was left, after thirty-five minutes' direct steaming, in a condition in which, though at 100° C., it could be at once put in the circuit and would at once absorb benzol. For about a quarter of the period of adsorption its temperature remained above 40° C.; but it was advisable to accelerate its cooling by passing cold water through the worm embedded in the mass.

Quality of Benzol

There was no difficulty in selling the crude benzol obtained, for automobile purposes, without further treatment. It had density 0·881, no trace of water, a limpid appearance, no trace of acid, soda or sulphuretted hydrogen; it gave a deep brown deposit with the acid test; it froze at 10° C.; it contained 0·35 per cent. of sulphur (whereof 0·09 was CS_2) as against 0·40 in commercial rectified and washed benzol; it gave no stain or gum on evaporation; it contained next to nothing of a high boiling point, 95 per cent. coming off below 125° C., 94·5 below 120° and 90·5 below 100° C., as against 100, 90 and 75 per cent. for commercial benzol.

The practical working was found to be of an extreme simplicity. A year's continuous working had shown no trace of mechanical impairment of the carbon; no splitting of the granules, etc. As to the adsorbent power, experience showed that with simple substances such as acetone, ether, benzene, and alcohol, the carbon remained absolutely unimpaired; but it would be too much to hope for this with coal gas. Coal gas contained organic cyanides, higher ammonias with benzol nuclei, naphthalene, etc., all adsorbed by the carbon. But tests made at La Villette as well as at Grenoble showed that the cyanogen products were completely removed by the steam and appeared in the condensation water; it was of great advantage to have these removed from the gas. The other compounds were less easily removed by the steam, and small quantities of them were found in the carbon after it had treated several million c. ft. of gas. The naphthalene was completely retained from the gas; most of it appeared in the benzol without affecting its value as a motor spirit, and superheated steam could drive any residues out of the carbon. There remained, however, certain hydrocarbons of high boiling point, and certain nitrogenous compounds, not easily displaced by steam. But these could be removed from the gas to begin with; a guard-filter with a special carbon could be fitted up before the debenzolisers; this would selectively adsorb them out, and the carbon in this could be renewed as required. If this precaution was taken, the carbon in the debenzolisers would retain its adsorbent properties for a very long time.

Silica Gel

Silica gel had been much studied in the United States. It was first obtained by Graham in 1861. Precipitate a solution of silicate of soda by hydrochloric acid, and a clot of hydrated silica was formed. On drying this over sulphuric acid, it shrank and dried into a hard and glassy, and very porous, mass. In 1890 Van Bemmelen showed that this mass was very adsorbent. As an adsorbent the mass had, however, very serious faults. Its adsorbent power was relatively small when the products to be adsorbed were very dilute, so that while it could take up 50 per cent. of benzene if there were 200 grm. per cubic metre, it could only take up 13 per

cent. if there were but 30 grm. per cubic metre, as in coal gas. Further, it had a preference for water vapour, so that from a gas containing 32 grm. benzol and 15 grm. water vapour it could only take up 8 per cent. of benzol, and ended with 25 per cent. of water and no benzol at all. Again, it was expensive to make.

These considerations had led the author to reject silica gel. A valuable paper by Professor E. C. Williams before the Chemical Engineering Group of the Society of Chemical Industry, March 7, 1924, he claimed, confirmed this view; but pointed out two advantages presented by silica gel, that it did not precipitate sulphur from sulphuretted hydrogen and that it could be completely burned out in an oxidising atmosphere. On the other hand the author noted that the precipitation of sulphur in active carbon was very difficult to obtain with wood charcoal however active it may be, at any rate with coal gas under the usual conditions; and that the experts were not in accord as to the possibility of completely regenerating silica gel by burning out.

The author concluded that oil scrubbing was only adapted to large works; and even in these, carbon debenzolisation gave much better results at less cost. For medium and even for very small works carbon debenzolisation was practicable, and could be recommended.

Importation of German Chemicals

London Merchant Charged with False Declarations of Value

At the Mansion House Police Court, London, on Thursday, August 7, Mr. A. C. Henry and Mr. Lionel Cooper were summoned, at the instance of the Customs authorities, for having made alleged false declarations with regard to the value of imported chemicals. The case against Mr. Cooper was held over, to be dealt with subsequently. Mr. Henry pleaded not guilty.

The Case for the Prosecution

Mr. G. G. Gibson, prosecuting, said that the charge was brought under the Customs Consolidation Act. The chemicals were consignments of phenacetin, imported from the Farbenfabriken Vorm. Friedr. Bayer and Co., of Leverkusen, Germany. The declarations were made on February 26 and March 3 of this year, and subsequently it was ascertained that Mr. Henry was, before the war, the agent of Fabriken Bayer for disposing of their products in England. Since then there had been various lawsuits, and as a result of those proceedings, and an agreement reached during those proceedings, the Bayer Products, Ltd.—a company registered in England and having the sole rights as to the trade marks of the German company—imported chemicals from the German company. Under the agreement the German firm invoiced the chemicals at cost price to the English company, who, in consideration of this, paid half their profits to the German company at the end of each year. Mr. Henry was a director of the English company, and was the nominee of the German company, for the purpose of protecting their interests. These facts became known to the Commissioners of Customs and Excise after the declarations in question had been made by Mr. Henry as to the value of the chemicals imported. Mr. Henry was also an independent merchant dealing in chemicals, and in the two cases under consideration he was the importer of the goods and had caused the declarations to be made. He had wished to import phenacetin and, in order that the German company might get the advantage of a certain payment of German reparations levied from their own Government, he had sent an order to Germany so that it would be received before November 15 last year. According to the agreement between the German and the English companies, however, Mr. Henry was not entitled to order the goods. The transaction passed through the books of the English firm, who would pay the German firm for the goods, and Mr. Henry would pay the English company. He had contended that the English firm were really the importers, but, whether they considered themselves to be the importers or not, Mr. Henry had represented to the Customs that he was the importer, had made the declaration of value, and had paid the duty—an *ad valorem* duty.

Mr. Gibson said that on February 26 the value, declared to the Customs, of five 1-cwt. kegs of phenacetin, with freight and insurance paid, was £91 18s. 3d., which worked out at 3s. 2d. per lb. On March 3 there was a consignment of 15 1-cwt. kegs, the value declared being £266 12s., which worked out at 3s. 1d. per lb. There were other values and prices, said Mr. Gibson. According to the books of the Bayer Products, Ltd., they paid the German firm £280 10s. 9d., whereas the value put down for Customs purposes was £266 12s.; in the other case the amount paid was £96 5s. 7d., as against the £91 18s. 3d. In explanation of that, Mr. Gibson said that German exporters had to obtain an export licence, and paid a fee for it. That was part of the price when the goods came to England, and apparently an invoice was sent to Mr. Henry from the German firm omitting that amount, and one was sent to Bayer Products, Ltd., which included it. The difference was £20 on the two consignments.

Another figure was the price which Mr. Henry had told the Customs representatives he had paid to Bayer Products, Ltd., for these goods. He said he had paid 4s. per lb., less 5 per cent., which was a price between 3s. 9½d. and 3s. 10d., and he gave the actual figures of the amounts paid as £319 4s., in place of the value set on them for Customs purposes—namely, £266 12s., and £112 in place of the £91 18s. 3d. The price at which the goods were ordered was 4s. 9d. per lb., which was the price ruling in Germany at the time. That meant that Mr. Henry had intended to pay 4s. 9d., plus freight and insurance, and, on top of that, the duty.

Mr. Roland Oliver (for Mr. Henry) said that all shipments from Germany were made by agreement at a price fixed on the day of despatch. The price on the date of the order was 4s. 9d., but it was lower on the day of despatch. Mr. Gibson agreed that the price had dropped to 4s. at the time the goods arrived, but that was still more than 3s. 1d. or 3s. 2d. He quoted market prices to show that the price at which the goods were invoiced did not represent the value of the goods, because no profit whatever had been allowed the manufacturers. The goods had been detained by the Customs, and if they had not been the Customs would have lost about £40 on the two transactions.

Expert Evidence

Mr. O. F. C. Bromfield (Secretary of the British Chemical and Dyestuffs Traders' Association) gave evidence, on subpœna, as to the price of phenacetin between February and June of this year. In February, he said, the price (including duty) remained fairly steady between 6s. 4d. and 6s. 6d. per lb. for fair quantities—½ cwt. or 1 cwt. During March it was about 6s. 3d. or 6s. 4d. During April there seemed to be a lot of material on the market, and he believed some comparatively cheap sales were made, which might have been at 6s. Later the price ruled from about 6s. to 6s. 2d., and he believed it is still about that figure. He had information that there had been one or two sales in London at a figure slightly below 6s., but there were unusual circumstances connected with the sales. As to the lowest value, at ship side, of phenacetin imported into this country, prior to the payment of duties, during the period in question, he said that during February and March the proper price was a little below that quoted by the Germans usually; the French, and possibly the Swiss, manufacturers could beat the Germans. The lowest price at which he had seen the German product quoted during February was 4s. 9d. per lb., but there was one isolated offer from Germany, f.o.b. Hamburg, during April, at 4s. 2½d.; as to the quality of that material he had no evidence. Asked for his opinion as to the quality of the Bayer phenacetin, he said it was as good as the best.

Mr. Roland Oliver, cross-examining, pointed out that the 6s. 4d. and 6s. 6d. included the duty to be paid under the Safeguarding of Industries Act, and 33⅓ per cent. had to be deducted before it could be compared with the invoice price to the importer. He also referred to a letter from the German company, dated February 5, which offered phenacetin in ton lots at 4s. 2d. per lb., whilst another on a different date quoted 3s. 6d. per lb. for quantities of 300 kilos or over.

Mr. R. J. Edwards (Secretary of Bayer Products, Ltd.) who was also subpœned, produced invoices and other documents relating to the transactions, and said that the invoices

to Bayer Products, Ltd., amounted to £20 more than the invoices to Mr. Henry.

Mr. J. W. Lichman (in charge of the Key Industry Department of the Custom House) said that in the first few months of the year the price of phenacetin at ship side varied from 4s. to 5s. per lb. He remembered once it was below 4s, but then the product came from France and the low price was due to the value of the franc. Cross-examined, witness said that the price which should be declared for Customs purposes, according to the law was the price which an importer would give at the ship's side.

Mr. Roland Oliver said that Bayer Products, Ltd., had a contract under which chemicals were invoiced to them at cost price; for months and months they had been declaring their phenacetin value at that cost price and there had been no proceedings until now. He asked if it were witness's view that it was not sufficient to declare the cost price, even though it was the invoice price. Witness agreed that it was not correct to do that, because it was not the price an importer would give at the ship's side. Mr. Oliver said it was the price which this importer actually did give. It was a matter of opinion as to what " an importer " meant. He asked witness whether he could not understand a man taking the view quite honestly that he was entitled to put down for Customs purposes the invoice price. Witness said he could not say that.

The Question of Arbitration

Mr. Oliver pointed out that the law provided that if, in ascertaining the amount to be paid, a dispute arose as to the value of the goods, the matter should be referred to a referee appointed by the Treasury, who should not be an official of any Government Department, and the decision of the referee should be final and conclusive. Therefore, it was not the practice to prosecute perfectly respectable people.

Mr. Gibson said it was the importer himself who must take the matter before a referee if he wished. He also held that the price to be declared for Customs purposes was the price an importer would pay, including all charges, profits and everything else. Mr. M. Kimber (Officer of Customs and Excise) produced various documents relating to the goods referred to.

When the proceedings were resumed on Wednesday, Mr. Roland Oliver (for Mr. Henry) addressed the Magistrate. Mr. Henry, he said, had been charged with deliberately and fraudulently making a false statement to the Customs authorities. He had given the invoice price of phenacetin imported from Germany, and that invoice price was, in fact, the cost price, allowing the German firm their overhead charges only. It had been said that, in the circumstances of the case, Mr. Henry ought to have made out a return showing some figure in excess of the cost price, in order to include the profit for the German manufacturers. The issue was not merely that he had made a wrong return. What the prosecution had undertaken to say and prove was that he did it falsely. Mr. Oliver submitted that the charge ought never to have been brought against a respectable gentleman such as Mr. Henry, against whose name and honour not a word had been said before.

Counsel then dealt with the events leading up to the formation of Bayer Products, Ltd., whose purpose was to market the products of the German company in this country. The agreement, by which goods from the German company were invoiced to the English company at cost price, in consideration of which the German company received a share of the English company's profits, was signed in April, 1923. For months, therefore, returns had been made, based on that invoice price, the English company taking the view that they should declare the invoice price. What other price could they put in? The law said that the invoice was *prima facie* evidence of the value of the goods. Was it to be said that the Customs could not see that this phenacetin from the Fabriken Bayer Co. was coming into the country at a lower price than other phenacetin? It was all done in black and white, and the Customs had accepted it without question. Mr. Henry was entitled to do what he knew the English company had been doing, obviously with the knowledge of the Customs. As to the reasons why Mr. Henry had ordered these goods, counsel said that up to November last the German Government had been refunding to their nationals the duties which were imposed on exports for reparations purposes. It was made known that November 15 was the last day on which the German Government would recognise the contract to do that, and was anxious to order the phenacetin from the German company before November 15. He knew that it could only be ordered by Bayer Products, Ltd., but he had taken the risk of ordering it himself, in his own name, because ke knew that Bayer Products, Ltd., would ratify it and treat it as a transaction by their agent. In fact, they had done that, because the company were entitled to employ any agent they chose. The order could not have been acted upon if the Bayer Products, Ltd., had not ratified it. Therefore, the company were the importers, and not Mr. Henry, because they had ratified his act. It was necessary, however, that the person making the declaration to the Customs should be the person ordering the goods, and that was the reason he had made the declaration. But because he had made that declaration, and had put in the same price as had been put in for months and months by Bayer Products, Ltd., he was charged with fraud.

Counsel asked the Magistrate to remember, if it were in his mind to convict, that Mr. Henry, though a director of Bayer Products, Ltd., was merely there to look after the interests of the German company, and had little to do with the English company's affairs. As to the evidence that invoices sent to Mr. Henry were lower than those sent to the English company, counsel said that when Mr. Henry was the importer of the German company's goods (before the English company was formed) those goods were invoiced to him at a price which included all charges, and therefore, when he received the invoices on which the present summonses were based, naturally assumed that they included everything. He had no knowledge of the other invoices sent to the English company, and was astonished when they were produced. If something was left out which should not have been left out (*i.e.*, export duties) it was probably due to carelessness in making out the invoices in Germany, and Mr. Henry should not be blamed. Counsel asked the Magistrate to give close consideration to the facts of the case before a man of Mr. Henry's reputation was convicted in that court of a charge which affected his honour.

Mr. Henry's Evidence

Mr. Henry, in evidence, described himself as a merchant dealing with drugs and fine chemicals. He was previously the representative in Scotland of the Fabriken Bayer Co., but in the early stages of the war he came to London to assist in the management of the business, which was then called the Bayer Co., Ltd. They were the sole importers into the United Kingdom of the products of the Fabriken Bayer. During the war the Public Trustee had ordered the Bayer Co., Ltd., to be wound up as an enemy trading concern. After the war, an American concern, named Bayer Incorporated, purchased the trade names from the Public Trustee. There was a good deal of litigation as to who had the right to use the trade names, and this resulted in the agreement already referred to, under which the Fabriken Bayer Co., of Germany, sold them to a new company, named Bayer Products, Ltd., which was formed in England by Bayer Incorporated, and the new company received goods at cost price. The agreement, said Mr. Henry, was not entered into for the purpose of evading key industries duties.

Referring to the specific transactions, he said he certainly took the view that the invoice price was the proper price to declare. He knew no other basis upon which he could make a return. He had ordered the goods from the German company in his own name because time was pressing, and he wished to get the orders confirmed before November 15. He agreed that he would not have received the goods if the orders had not been accepted by Bayer Products, Ltd., as orders from their agent. He had not the slightest knowledge that the invoices sent to him differed from those sent to Bayer Products, Ltd. It was pointed out by counsel that the export duty was not included in the invoices sent to Mr. Henry, and Mr. Henry said he had been under the impression that it was included. He had not the slightest intention of making a false statement. The goods were actually imported by Bayer Products, Ltd., and he bought them from that company.

Cross-examined, Mr. Henry said he was not aware that the Customs had never been informed that the German company

were receiving 50 per cent. of the profits of the English company. It was also suggested to him that, by obtaining the phenacetin from the German company, he was able to undercut the market in this country, but he replied that he had sold at competitive prices, though the prices varied, because the quantities bought by the various buyers varied. This concluded Mr. Henry's case.

Questions were then put by the Magistrate to a Customs official with regard to the acceptance by the Customs Department of the invoice prices. He said they must accept the invoice prices in the absence of suspicion, and if in any particular case there was ground for suspicion they made inquiries.

The Magistrate said he must convict in this case. In his opinion, Mr. Henry must have known at the time that the price at which these goods came through was not the price at which they would come through to an ordinary person. He believed, however, that Mr. Henry was an honest man. He imposed fines of £50 on each of the two summonses, and costs of £5 5s. in respect of one summons.

It was then stated that Mr. Henry would appeal. There is another summons against Mr. Henry and Mr. Lionel Cooper (managing director of Bayer Products, Ltd.) which, it was said, involves the same points as were involved in the summonses already heard against Mr. Henry. Therefore, application was made for this to be held over until after Mr. Henry's appeal was heard. After further discussion, the proceedings were adjourned *sine die*.

British Chemical Plant Manufacturers

Chairman's Review of Recent Progress

At the annual general meeting of the British Chemical Plant Manufacturers' Association, held at 166, Piccadilly, London, on July 30, the address of the retiring chairman (Mr. L. M. G. Fraser, M.I.Chem.E., M.I.Pet.Tech.) took the form of a suggestive and informing review of recent progress in chemical plant construction.

IN moving that the report and accounts of the Association for the year be adopted, Mr. Fraser explained that the Association in the main was, he presumed, a commercial Association, although it did not deal in price or rate fixing. They were too diversified in manufacture to do that, but they did advance their interest by propaganda work. They also hoped to continue joint meetings with the chemists on any subject of general interest to their members. Especially he drew attention to the study of the numerous alloys now available, and the reduction of their number to practical proportions. Next year they might consider it advisable to bring out a new Directory. Perhaps also the Joint Committee would draft a list of really useful alloys with their qualifications as to physical conditions and resistance to corrosion.

Progress in Chemical Plant Manufacture

Many of you, the Chairman continued, can cast your minds back a great number of years and view the progress of chemical plant manufacturers, while others must view it from general knowledge handed down during the past 40 or 50 years. Nowadays, the tendency of engineers is towards concentration, or, rather, to obtain a greater and more efficient production from the same apparatus. We have instances of this in the increased output and efficiency of steam boilers, steam engines, power plant of all descriptions, evaporators, furnaces, stills, grinding plant, mixers, filtering plant, and a great variety of other chemical plant. How and why has this come about? It used to be considered in the old days that a tank maker, boiler maker or engineer could produce equipment for a chemical factory, but the yields called for were not what we as plant makers to-day have to be prepared to guarantee, and the result is that the chemical plant builder has become a person requiring a training distinct from that of a general engineer. If philosophy is the postulating of general principles and science the clothing of those principles, the chemical plant builder, to be entitled to such a position as he could wish to attain in his profession, will have to be somewhat of a philosopher, somewhat of a scientist, and a first-class engineer, and to be in a position to say to the chemist: "Let me know your requirements and I will fulfil them to the utmost of the knowledge at present available." He must, in the first place, realise first principles, and in the second place be able to grasp the scientific aspects that are likely to arise.

Such being the present position as I conceive it, how are we best able to maintain it? Research workers on all varieties of subjects in connection with chemistry, physics, mechanics, etc., are publishing the results of their investigations either through the various scientific societies, leading technical journals, or press, and we have by this means considerable opportunities of acquiring knowledge. Some firms have their own research laboratories for their own particular requirements and others have acquired their knowledge through long experience. We look to the educational bodies to improve and bring up to date the particular education required by the practical engineer in our branch, but a word of caution is here suggested against the tendency for the course to be overcrowded with theory or to be stretched out over too long a period.

We in the practical works will more likely find our useful material in the mind trained in the works with general principles of physics and mathematics well understood, rather than in the young men of high mathematical and physical attainments. Higher mathematics are not greatly used in general work, but are useful in the higher refinements of particular problems of improvements in machinery. It is not to be denied that the mechanical sciences are to a large extent exact sciences, but all our problems, or most of them, are hedged about by the incalculable, it may be in unknown surface tension, or in sudden alterations at critical temperatures (such as the frothing of certain substances which occur only between certain temperatures beyond which they give no further trouble) or pressures, or of physical properties connected with difficult depositions in bulk, fog or mist. In all such cases experience must ultimately be the deciding factor.

Improvements in Construction

The improvements in the construction of chemical apparatus have generally been along well defined lines and can be broadly classified as follows: (1) Better products obtained, (2) lower working costs, (3) cheaper apparatus, (4) safer operations. This is not an occasion for giving a critical description or survey of the various improvements in various types of plant used, but a brief *resumé* of improvements as directly applied to several items of chemical apparatus will show how they have been affected.

1. So far as apparatus is concerned, better products are being obtained by the use of known metals or alloys which have been tested out under varying conditions of strengths and temperatures with a number of chemicals, both under laboratory and works conditions, and we are able to suggest alloys for use in plant which prevents contamination of the material being manufactured without troubles of purification in the later stages, and which also gives longer life to the plant.

2. The action of heat under varying conditions is more intimately known, and overheating, with resultant decomposition or burning, is more easily guarded against.

3. The improvements in grinding machinery have enabled many hard materials to be satisfactorily ground to required fineness without undue proportion of dust or contamination, and with a consequent better chemical reaction where required in the later stages of the process. The greater use of the mechanical screen, and the passing of the partly ground materials more frequently over the screen, clears away quickly the particles ground to the required degree of fineness, relieves the mill, increases the output and saves power and time. In past days, only ½-ton per hour could be obtained from grinding plant with certain materials per given horse-power, whereas to-day five or more times that amount can be turned out per hour with no more power absorbed, and less wear and tear on the plant.

The formation of emulsions by high-speed mills has been made an easier proposition.

The knowledge of filtration, and what takes place on the filtering medium, has increased the usefulness of the filter press, and we are now able better to estimate the pressures the sludge will stand. Continuous filters have proved their utility and the latest developments of the stream line filter are being carefully followed, and I am glad to acknowledge that we have members of our Association who are carrying out some good and useful research on this subject.

In distillation, owing to the recognition of the importance of increased velocities, greater results per square foot of surface have been obtained and more delicate materials can be handled with less risk. The action that goes on inside the still column is being more clearly grasped. The column can give cleaner cuts in the fractions, with greater purity, and columns can be designed to give continuously two or three fractions.

Mechanical crystallisers, which were on the market many years ago, are again being brought forward, and the claims are made that better and purer crystals are obtained thereby.

The problems of mixing dry and wet materials can yet be studied with advantage, and a great deal of useful power saved by the studying of the rapidity of the absorption of chemical reaction that is required to take place. Where the time factor comes in, large mixers with slow motion and less relative power may be advantageous, and with rapid solution smaller mixers and quick motion is advisable. I have known cases where a very large amount of power was saved when several dry ingredients had to be mixed by the simple expedient of studying the order in which the materials were put into the mixer.

Furnaces have of late received far more attention and the importance of scientific furnace setting is now well recognised, and whilst oil burners, gas firing, mechanical stokers, and mechanical draught all contribute to increased plant efficiency, they result in more severe furnace conditions and contribute to frequent breakdowns unless careful thought is given both to the design and to the refractory materials and cements used. One refractory cannot be a panacea for all ills; conditions are so varied, and the requirements of a refractory brick, block or cement so diversified that it is necessary to give careful attention to all demands of temperatures and weights to prevent cracking or bulging and to minimise slagging or clinkering.

The use of electricity is continually becoming more widely known and used in chemical industry in the electrolysis of alkali chlorides, water and organic compounds, and also as a means of separation, either of solid matter or minutely condensed particles of vapour in form of mist or fog. The cells used at present are practically of four types—diaphragm cells, bell jar cells, mercury cells, fused electrolyte cells—and of these the first two are the most favoured.

A considerable amount of research work has been carried on with regard to improvements of the diaphragm and anodes, which improvements, however, are slow but continuous.

The electrolysis of salt had reached a very high state of commercial efficiency. Electrolysis of water appears to have gone as far as possible. The electrolysis of inorganic compounds, etc., awaits development in many directions, but with experience from similar work the plant can be properly designed. The highly complicated reactions that take place, however, do, at the present time, need investigation. Electroreduction is more promising, and it is interesting to note that in Italy one firm uses an ordinary cell for making mercury amalgam, which is subsequently used to reduce organic compounds.

The separation of ashes from coke and unburnt coal by means of electromagnetic separators is now being carried out on a commercial scale.

Lower Working Costs and Cheaper Apparatus

Lower working costs have been brought about mainly through the more detailed study of the power factor in connection with the movement of bulk material, or, in the general process, in the saving of heat units through the study of the thermal efficiency of fuel or interchange of heat from one material to another, the quicker and more efficient method of carrying out parts of the process with greater freedom from breakdown of machinery and plant, causing dislocation of work and of the regular flow of products through the factory.

The automatic control of temperatures, whether in furnace or steam heating, automatic electric appliances for moving bulk material, automatic filling of powders and liquid, automatic weighing and packing, are other factors in the lowering of cost of production of chemicals.

Cheaper apparatus is now obtained, owing principally to the large amount of research work that has been carried out in studying the rates of flow, whether in calories or liquids, and which has enabled the engineer the better to calculate the strains and stresses and outputs under which his machinery has to perform. In other words, he is able to reduce the incalculable quantity.

There are a great number of other improvements in various types of machinery which are the outcome of practice and experience in the various branches of plant building, which although they are not fundamental departures, are improvements in detail or alterations to main branches of the general principle.

The sum of all these improvements has enabled us to surmount many difficulties and to lay our plans with greater confidence.

New Officers

The report, which showed that the Association had had a very useful year, was adopted.

The following are the officers and committee for the ensuing year:—Chairman: Mr. F. R. Blizzard (Messrs. T. and C. Clark and Co., Ltd.). Vice-Chairman: Mr. James Robinson (Messrs. Mather and Platt, Ltd.). Treasurer: Mr. E. A. Alliott (Messrs. Manlove, Alliott and Co., Ltd.). Committee: Mr. H. Bush (Huntington, Heberlein and Co., Ltd.), Mr. L. M. G. Fraser (W. J. Fraser and Co., Ltd.), Mr. J. A. Reavell (Kestner Evaporator and Engineering Co., Ltd.), Dr. R. Seligman (Aluminium Plant and Vessel Co., Ltd.), Mr. E. C. Watkins (W. Neill and Son, Ltd.), Mr. J. W. Wright (Cannon Iron Foundries, Ltd.).

Lock-Out at Laporte's Works

THE chemical works of B. Laporte, Ltd., situated off Kingsway, Luton, on Monday became involved in a lock-out which at present is stated to affect some 70 of the employees.

According to statements made on the workers' side the employees were on August 8 summoned to a works meeting at which they were notified that they were to consider their engagement terminated, but the works would be open as usual on Monday, August 11, and men who presented themselves could continue work provided they did not hold a trade union card. The decision arrived at in a conference between the Trades Council and the local members of the Chemical Workers' Union was that the workers should present themselves as usual at work on August 11. This was done, and on arrival they were asked to sigh a form stating that they were not members of the trade union. Those who signed resumed their employment and the others were not accepted. The latter are said to number 70, and all of these had not previously joined the Union.

An authoritative statement given by Mr. H. E. Alcock, Chairman of B. Laporte, Ltd., on Wednesday, said that the works were then open to all their men whether union or non-union.

"We are not in any sense opposed to Trade Unionism," said Mr. Alcock. "The reason we took up the attitude we have done with this particular Union was due to the representations they made to our men. Those representations were leading the men to believe that by being members of this Union they would procure wages which, we know, would absolutely kill the industry—wages far in excess of the average wages paid in Luton at the present time.

"Our workers are to-day receiving wages which compare very favourably with the average rate of pay, and it is well known that Laporte's have kept their men fully employed when many other firms in the town have been on short time.

"More than half the men expressed their willingness to sign the undertaking they were asked to sign and commence work, but since Monday, as a result of intimidation, a number of these have felt constrained to stay away from the works."

Messrs. B. Laporte's had 271 employed up to the time of the lock-out, but on Wednesday only 110 were left at work.

Preservatives and Colouring Matters in Food

Formaldehyde Condemned by Committee of Experts

A committee of experts (which included Professor F. G. Hopkins, Mr. G. Stubbs, F.I.C., and Mr. P. A. Ellis Richards, F.I.C.), appointed by the Government to inquire into the use of preservatives and colouring matters in food, has issued an interim report in which it strongly recommends the discontinuance of the use of formaldehyde. Some extracts from the report are given below.

Formaldehyde as a Preservative

FORMALDEHYDE is an oxidation product of methyl alcohol. At ordinary temperatures formaldehyde is a gas which is extremely soluble in water; a solution of this substance in water containing 40 per cent. of formaldehyde is known as "formalin," and it is as formalin that formaldehyde comes into commerce for various purposes, including its use as a preservative for food.

Formaldehyde is a preservative substance which is inimical to life and to vital processes of all kinds; it is a powerful protoplasmic poison. Formaldehyde when ingested exerts an irritant action upon mucous membranes, and after prolonged use appears to cause inflammatory changes in the liver and also in the kidneys where a portion of it is excreted. In the body formaldehyde is partly oxidised to formic acid and partly excreted unchanged; in its passage through the body it combines with tissue proteins, and this combination renders its excretion slow, so that it is probably cumulative; and this feature makes its use as a preservative of food particularly objectionable. Formaldehyde may retard digestion even when present in food in comparatively great dilution, and it combines with the protein constituents of foods, forming a compound which is less digestible than the original substance. Even if this formaldehyde-protein compound is ultimately digested and the products of digestion are absorbed, it is possible that these products are abnormal in character, and present knowledge does not justify us in asserting that they could be regarded as unobjectionable and without effect upon the normal metabolic processes of the body. On the contrary, recent advances in our knowledge of biological processes point to the far-reaching importance of the effects produced upon metabolism and nutrition by extremely minute amounts of substances ingested and absorbed, and in view of this a substance such as formaldehyde, which is known to produce gross changes in the composition of food materials and to be inimical to life even in high dilution, must be regarded with grave suspicion in regard to its possible ultimate effects upon the normal processes of metabolism.

Quite apart from the question whether formaldehyde is undesirable as a preservative for fresh food, its use for the purpose for foisting upon the consumer an article which has already begun to decompose is unquestionably reprehensible.

There is in this matter an almost complete consensus of opinion amongst commercial and public health interests. These interests are too often opposed, but we desire here to record our impression that amongst the more enlightened and far-seeing firms engaged in the preparation, sale and distribution of food there is a growing tendency to recognise that the true interests of the trader are similar and run parallel with considerations affecting the interests and health of the consumer.

The Departmental Committee on Preservatives and Colouring Matters in Food which reported in 1901 regarded the addition of formaldehyde to food or drinks as so objectionable that they recommended that its use for such purposes should be absolutely prohibited.

We may add that, with scarcely an exception, every country which has made legal enactments or regulations in connection with the purity of its food supply has prohibited the addition of formaldehyde to food either specifically or implicitly in a general prohibition of preservatives.

Having regard to the interests of the trader and of the consumer we have no hesitation in recommending that the addition of formaldehyde or any of its derivatives to food or drink should be absolutely and specifically prohibited.

The Linley Process

It has been represented to us that the Linley Process is not open to the recognised objections to the ordinary use of formaldehyde as a food preservative, on the ground that owing to the special method of application only a small amount of formaldehyde is required and the quantity absorbed by the meat is negligible. We have given careful attention to this matter, and we have had regard to a variety of considerations, including the representations made to us by the firm desirous of using the Linley Process, by the inventor of the process, and by others who gave evidence before us.

The object of the Linley Process is to enable beef to be carried chilled at a temperature of about 29° to 30° F. from distant countries, such as the Argentine and Australia, so as to arrive in this country in good condition and free from moulds which are apt to develop on the surface of lightly chilled beef after the lapse of a certain time. The Linley Process was in operation some years before the war in connection with the transport of chilled beef to this country from the Argentine, but by no means all of the Argentine chilled beef sent here was treated by the process. During 1909 and 1910 five trial consignments of chilled beef treated by the Linley Process were sent from Australia, but after that date shipments were discontinued. After the outbreak of war in 1914 the importation of chilled beef ceased and the Linley apparatus was removed from ships which had been equipped with it, and since then the process has not been revived. In a decree dated February 20, 1923, the Argentine Government prohibited the treatment of meat by the Linley Process.

The present position is as follows. The country with the largest export trade in chilled beef has prohibited the treatment of chilled beef with formaldehyde. The United States Government has specifically prohibited the importation of meat treated with formaldehyde. Every other country with scarcely an exception which has made regulations in connection with the purity of food has prohibited either explicitly or implicitly the treatment of any food material with formaldehyde. Finally, the Linley Process is not now in operation in any part of the world.

We have given careful consideration to trade interests in so far as they are compatible with or in furtherance of the interests of the consumer. It appears possible that a section of the trade might benefit financially by the treatment of chilled beef with formaldehyde, but we think that the true interests of the trade as a whole would not be furthered by a revival of the practice. There appears to be much in the statement that the treatment of beef with formaldehyde may correct, in part at any rate, improper and defective methods of preparation, handling, storage and transport, but it is undesirable that preservatives generally should be used to support the perpetuation of bad methods in dealing with foodstuffs. We are satisfied that the consumer will not be prejudiced by our non-interference with existing conditions in the meat trade and that no ultimate advantage to the consumer would accrue from a revival of the Linley Process.

Having regard to all the information which has been given to us, we are of opinion that no exception in favour of the Linley Process should be made from our general condemnation of the use of formaldehyde in any article of food or drink.

We therefore recommend that the treatment of meat with formaldehyde or any of its derivatives should be specifically prohibited.

Dyestuffs Licences for July

THE total number of applications for licences under the Dyestuffs (Import Regulations) Act, 1920, received during July was 515, of which 316 were from merchants or importers. To these should be added 35 cases outstanding on July 1, making a total for the month of 550. These were dealt with as follows:—Granted, 363 (of which 330 were dealt with within seven days of receipt); referred to British makers of similar products, 135 (of which 106 were dealt with within seven days of receipt); referred to Reparation Supplies available, 40 (all dealt with within two days of receipt); outstanding on July 31, 1924, 12. Of the total of 550 applications received, 476, or 87 per cent., were dealt with within seven days of receipt.

How British Shipping Freights Restrict Trade

Action by Chemical and Dyestuff Traders

For a considerable period the question of shipping freights on traffic from United Kingdom ports has received the attention of almost every industry concerned with export. The present regulations, in many cases, not only make it almost impossible for British exporters to compete with foreign firms, but have the direct effect of sending business abroad which, on the basis of normal competitive prices, could easily be retained in this country. The British Chemical and Dyestuffs Traders Association, Ltd., has endeavoured to obtain publicity for these detrimental rulings and at present are attempting to claim the attention of the newly appointed Parliamentary Committee of Inquiry upon Trade.

Writing to Mr. Sidney Webb, President of the Board of Trade, the Association said :—

" In our capacity as merchants and as selling agents for various British manufacturers, we have the opportunity of competing for orders for various Colonial and Foreign markets. It is a very frequent experience that we are quite unable to secure these orders for our British principals, not on account of their goods being inferior to, or their price higher than, those of their Continental competitors, but solely by reason of the difference of shipping freight, often by the same steamship company, from British ports and Continental or American ports respectively. At considerable expense recently we sent a representative to South Africa expressly to seek orders for zinc dust of British origin. He was quite successful in convincing the consumers (the various gold mining companies) of the advantage of the English product, and buyers were more than willing to place orders on a competitive basis. When the time came for submitting quotations it was found, as will be seen by the list enclosed, that the 3 per cent. preference granted by the Union Government to British material was more than swallowed up by the additional freight demanded by the shipping companies from British ports, as compared with the rates from the Continent. The result has been that the business has been lost to the manufacturers in this country —with its consequent effect on unemployment—the railways have lost the transport from the works to the ports and the ports have been deprived of the handling of the goods. . . . We are concerned about this, not only from the point of view of personal advantage, but with the fact that these are definite instances of impediments to the greatly needed revival of British manufacture and trade. Before troubling you we have ourselves repeatedly placed the matter before the Chamber of Commerce, have written the shipping companies, and have interviewed the officials of the Shipping Conference, and in no case have we received the least sympathy or encouragement to hope that this injustice would be remedied."

Comparison of Charges

The following is the table of comparative charges referred to :—

Material.	From.	To.	Rate per ton.	Advantage to Foreign exporter.
Zinc Dust	Liverpool	Riga	40/–	
	Antwerp	Riga	15/–	166 per cent.
Zinc Dust	Birkenhead	Durban	100/–	
	Antwerp	Durban	63/6	58 per cent.
Zinc Dust	London	Durban	83/6	
	Antwerp	Durban	63/6	31 per cent.
Zinc Sheets	Manchester	Beyrout	70/–	
	Antwerp	Beyrout	27/–	159 per cent.
Zinc Dust	Birkenhead	Bombay	120/–	
	Hamburg	Bombay	45/–	166 per cent.
Zinc Dust	Birkenhead	Durban	100/–	
	New York	Durban	67/6	47 per cent.

Regarding zinc dust to South Africa, shippers from the United Kingdom are not allowed to have their cases placed below deck, consequently their goods are exposed to all weathers, and, in addition, have to pay an increased insurance premium. Shippers from Antwerp have no such regulations to comply with, and can have their cases stowed below deck.

The reply to the letter stated that the attention of the authorities had frequently been drawn to the question, and continued : " The reason for the difference is that Continental lines are able, for various reasons, to carry goods at a lower cost than the British lines, and the British lines have to carry from Continental ports at the same rates as their competitors if they are to secure any business from those ports. The matter is carefully watched by the Board of Trade, but there is no power to regulate freights or to require Continental rates to be charged from British ports, and the Board do not consider it feasible to introduce legislation on the subject."

Reply to the Government

In acknowledging this letter the Association, on July 5, said : " We understand that the British Government is aware of the fact that British steamship companies, many of them receiving Government subventions in the way of mail contracts, are in the habit of imposing unduly heavy freight rates on British traders in order to be able to ' dump ' their services on the Continent, and quote rates to foreign traders at below cost price. We gather, further, that, having this knowledge, the Government does not consider it desirable to obtain powers to deal with this subject, and that its regard for the interest of British manufacturers and traders is confined to carefully watching the matter. In view of the fact that the livelihood of thousands of British workers is destroyed by this policy of the shipowners, it appears to us obvious that the Government is unconcerned with practical means of providing employment and declines to adopt measures which would be enforced immediately if the destruction of life by war were in question. For your information we have this week received advice from overseas that two of our recent tenders have been rejected in favour of foreign material, on account of excess of price, attributable to the additional freight on which we have to compute, such additional charge being used to support our competitors abroad.

" As we consider that this is a matter of urgent public importance to the workers, manufacturers and traders of this country, we propose to take such steps as appear to us to be desirable to make known as widely as possible the action of the shipowners and the inaction of the Government, and we presume you have no objection to offer to this course."

The latest protest, an attempt to enlist the interest of the new Committee of Inquiry upon British Trade includes the following passages, in bringing to their notice the preceding correspondence :—

" The cases instanced can be amplified in many directions and apply to all chemicals and colours and, I believe, to all seagoing traffic. It is found that on account of the shipping lines charging prohibitive freight rates for shipment from United Kingdom ports the only method of holding Eastern and other overseas connections is to either trans-ship the goods at a Continental port or purchase the goods on the Continent and ship them direct. Business amounting to heavy tonnage is lost to this country every week on this account and is being placed on the Continent. This is solely due in most instances, not because the foreign material is cheaper, sometimes it is a little dearer, but the fact that freight rates from United Kingdom ports make the price to the foreign buyer non-competitive. It is considered unfair that British shipping lines should quote very preferential rates for shipment from the Continent, and in the opinion of my Executive Council such practice is one of the chief factors against a revival to normal conditions of the export trade of this country. I am to add that should any further evidence on this important matter be desired we will gladly furnish same, and it is hoped that your Committee will see their way to give this matter prominent notice in their report to the Government and make recommendations that will have the effect of releasing British exporters from the handicap which they are at present under when competing with Continental firms for overseas business."

Cyanogen Chloride as an Insecticide

Tests are being carried out in the United States by the Chemical Warfare Service to determine the effectiveness of cyanogen chloride and other poisonous gases as a means of fighting the boll-weevil in the cotton crop. Cyanogen chloride in many ways seems suited to the work, being heavier than air and giving adequate warning of its presence owing to its lachrymatory properties. The plan followed is to release the gas on calm evenings and allow it to drift over the cotton fields.

Chemical Papers at the British Association

A Representative Series of Contributions on Various Subjects

Full reports of all the papers presented before the sessions of the Chemistry Sectio.. the British Association are not as yet available, but we give below summaries of some of them, and a complete list of the rem ler on the agenda, for reference purposes.

Activation of Nitrogen

PROFESSOR W. A. BONE, F.R.A., presented a paper entitled "The Activation of Nitrogen in Carbon Monoxide-Air Mixtures at High Initial Pressures," in which he described the principal experimental results obtained in conjunction with Messrs. D. M. Newitt and D. T. A Townend during their recent researches. In these it has been discovered that nitrogen exerts a peculiar energy-absorbing influence when carbon monoxide-air mixtures are exploded in a bomb at high initial pressures, which is not manifest at all when corresponding hydrogen-air mixtures are similarly exploded. The observed facts are explained on the supposition that there is some constitutional correspondence between CO and N_2 molecules (where densities are identical) whereby the vibrational energy (radiation) emitted when the one burns is of such a quality as can be readily absorbed by the other, the two thus acting in resonance. The nitrogen thus becomes chemically "activated" in carbon monoxide-air explosions at high initial pressures, and in such state is able to combine with oxygen more readily than does nitrogen which has merely been raised to a correspondingly high temperature in a hydrogen-air explosion. The influence of varying *initial* explosion pressures up to 100 atmospheres upon the said "nitrogen-activation" is shown, and the bearing of the results upon the problem of "nitrogen-fixation" was discussed.

Separating the Rare Earths

In a paper by Professor James Kendall and Mr. Beverley L. Clarke on "A New Method for the Separation of Elements of the Rare Earths," stated that the ionic migration method which had been proposed for the separation of isotopes, had been successfully extended to the fractionation of certain rare earth mixtures. A gel containing the given mixture was placed in a long glass tube, between a section of potassium chloride gel (nearer the anode) and a section of chromic sulphate gel (nearer the cathode). On electrolysis, since the K ion moves more rapidly than the rare earth ions, and the Cr ion moves more slowly, the two boundaries of the central section remain quite sharp even after it has travelled a long distance. If the rare earth ions themselves had appreciably different mobilities, the faster ion should accumulate in the front portion and the slower in the rear portion of this section, so that a complete separation should readily be obtained. Short runs had been carried out with three mixtures—yttrium-erbium, gadolinium-samarium, and neodymium-praseodymium. In the first two cases a 400-cm. run gave practically perfect separation; in the last the separation was only partial.

Canadian Electrolytic Alkali

An interesting account of "The Canadian Salt Company's Processes for the Manufacture of the Alkali-Chlorine Products" was given by Mr. D. A. Pritchard. The plant of the Canadian Salt Company at Windsor, Ontario, is situated over salt deposits of vast extent and is near enough to Niagara Falls to render the use of electric power from that source economical. The plant is also favourably located for both water and rail distribution. The first electrolytic alkali plant in Canada was installed in 1912 by this company. The cell used is named after its inventor, Arthur E. Gibbs, an Englishman. In Canada, the United States, and England there have been installed to date Gibbs' cells to the capacity of approximately 45,000 h.p. Details were given of the mechanical bleach-making equipment employed, believed to be the only successful one on this continent. A complete description of the manufacture and handling of liquid chlorine, in which industry the company is the pioneer in Canada, was also included in the paper.

Surface Tension and Crystal Structure

In the joint discussion with the Mathematics and Physics Section Professor C. H. Desch presented a paper on "The Crystal Surface." He pointed out that the atoms of a crystal being arranged in a space lattice, all atoms in the interior of a crystal must be symmetrically disposed. At the surface of a crystal this sym" ry disappeared, so that the properties there would be differ nt from those of the mass, and a part of this difference m . ifested itself as surface tension. With the increase of temp . ature the cohesion and surface tension in general diminished but not necessarily at the same rate. At high temperature the surface tension might be sufficient to cause rounding o he sharp angles of a crystal. This had been shown by experiments with gold. Beads of gold, slowly cooled from the liquid state, had a skin which had properties like those of a film of gelatin, the normal structure being exposed when the fi was removed by etching. The sharp octahedral "etch-fi ," on large crystals of gold, or the angles of minute cry- als prepared by precipitation, became rounded at temper- ures several hundred degrees below melting-point.

X-Rays and . .cture of Organic Compounds

Dr. G. Shearer d. lt with "The Chemical and Physical Significance of X-Ray Measurements of Compounds containing Long Chains of Carbon Atoms." X-ray measurements, he said, appeared to give reliable values for the lengths of these molecules; they showed that the basis of the structure was actually a chain of carbon atoms which might have one or other of a limited number of forms. The observed rates of increase of the lengths of the molecules with the number of carbon atoms they contain were in accordance with the assumption that successive pairs of carbons were linked together at the tetrahedral angle; this would imply a marked directive property of the valency bond in carbon. The method of investigation would appear capable of throwing light on many problems of stereochemistry—geometrical isomerism, the nature of double and triple bonds, etc. The existence of spacings often as great as 60 A.U. made it possible to observe a large number of successive orders of reflection, and a study of the intensity distribution among these different orders was of interest.

A paper on a related subject was given by Mr. W. T. Astbury, who dealt with "The Determination of Molecular Symmetry in Crystals and its Possibilities as a Method of Deriving Structural F rmulæ." It was possible, he explained, given the class of crystal, with two exceptions, to decide definitely the space-g. , and thence, from the number of molecules per cell, deri . the only symmetry elements possible to the molecules as they were built into the crystal. Then, by a critical examination of the dimensions of the cell and the relative positions of the molecules within it as given by the space-group, it was often possible to make a clear choice between two or more suggested structural formulæ, even though the molecule was fairly complex. But, in general, it was essential to know from chemistry the various possibilities. The molecular symmetry in the crystal was in general less than what would be expected of a molecule in the free state. A brief account was given of the application of this method to the problem of the isotrimorphism of the tervalent metallic acetylacetones and the structure of the acetylacetone group.

Chemical Therapy

There was considerable interest attaching to the presidential address in the Physiology Section by Dr. H. H. Dale, on "The Progress and Prospects in Chemotherapy." After a reference to the interest aroused in the discovery of insulin at Toronto, Dr. Dale said that of artificial remedies which had been empirically discovered the best that could be hoped was that they would eliminate the parasite before they poisoned the patient, but a new therapeutic ideal had been gained from the study of anti-bodies and the question had arisen whether, with the new and growing powers afforded by synthetic chemistry, man could not produce in the laboratory substance specifically adapted to unite with and kill the protoplasm of these parasites, as the natural anti-bodies united with that of others, and to leave the tissues of the patient similarly unaffected.

Dr. Dale then went on to describe the investigations that had been carried out into the curative value of various sub-

stances, including dyes and analogous compounds, an example of which was the celebrated "Bayer 205," as well as derivatives of arsenic and bismuth. Although the results of these investigations had led to considerable success in the cure of various infections, a certain disharmony was displayed between the results of experiment a[illegible]che theoretical conceptions of the nature of the che[illegible]herapeutic process. There was sufficient evidence in conne[illegible]r, for example, with the curative influence of "Bayer 205" to prove that in that case there was no question of a substance curing simply on account of its affinity for parasites and its lack of affinity for the host's tissues. They might, indeed, feel reasonably certain that the affinities of that substance for the constituents of the host's blood and tissues played an important part in the curative properties.

Industrial Alcohol Regulations

Summary of the Present Br[illegible]h Regulations

THE complete version of Sir Robert F[illegible]tson's address at the British Association Meeting at Toronto contained the following summary of the facilities at present ava[illegible]ble.

Mineralised methylated spirit consists of a mixture of 90 parts of alcohol, 9½ parts of wood [illegible]ha, and half part of crude pyridine, together with ⅛th of [illegible] per cent. of mineral naphtha and 0·025 of an ounce of mct[illegible]l violet dye in each 100 gallons of the mixture. It is sold under licence, but is otherwise unrestricted and duty-free.

Power methylated spirit is prepared in accordance with the following formula: 92 parts of alcohol, 5 parts of benzol, 0·5 part of crude pyridine, and 2·5 parts of wood naphtha, together with 0·025 of an ounce of Spirit Red III. dye in each 100 gallons of the mixture. This is also sold without restriction and freedom from duty when mixed with 25 per cent. of hydrocarbons or denatured ether or some other substance approved by the Commissioners of Customs and Excise.

Industrial methylated spirit, consisting of 95 per cent. of ethyl alcohol and 5 per cent. of wood naphtha, can be obtained for the arts and manufactures under the authority of the Board of Customs and Excise, under bond and certain not very onerous restrictions. Between three and four million bulk gallons are annually used for the making of such products as varnishes, linoleum, soap, solid medicinal extracts, ether, toilet preparations for external use, fine chemicals, photographic plates, dyes, surgical dressings, fireworks, and for many other purposes, including its use in the chemical laboratories of colleges, schools and works, and for preserving museum specimens. It is free from duty, but must not be present in an article capable of internal use, either as a beverage or a medicine.

Duty-free pure alcohol is allowed by the Board of Customs and Excise for scientific purposes to universities and public institutions for teaching and research, and specially denatured alcohol in arts and manufactures in which the use of the industrial methylated spirit is unsuitable.

Pure Alcohol for Laboratories

The pure alcohol is allowed to colleges and public institutions for teaching and research purposes without any onerous conditions beyond the keeping of a stock account. Pure methyl alcohol is permitted by the Board of Customs and Excise to be used duty-free in arts and manufactures under regulations similar to those for industrial methylated spirit, and is largely used in the manufacture of formaldehyde, of methyl derivatives among dyestuffs and fine chemicals, and for the purpose of crystallisation.

The specially denatured alcohol, also free from duty, is allowed to manufacturers under restrictions compatible with the safety of the Revenue, a very wide choice of denaturants being permitted. When, as frequently happens, a suitable denaturant is found in some intermediate product, or acid used, or produced during the manufacturing operations, or when the alcohol is a constituent of some mixed solvent, permission is the more readily granted for its use. An example of progressive policy in the use of pure spirit is the recent decision of the Board of Customs and Excise to allow the use of pure ethyl alcohol denatured with 2 per cent. of pure methyl alcohol in the production of insulin, without onerous Excise restrictions. It is understood that the recent action of the Board of Customs and Excise has been received with satisfaction by the Association of British Chemical Manufacturers. The quantity of pure and specially denatured alcohol used during last year was about half a million gallons.

In the case of duty-paid spirits used for medical purposes, such as the preparation of tinctures, etc., and for scientific purposes in chemical laboratories, a rebate is allowed under the Finance Act of 1920, amounting to about 80 per cent. of the duty.

While the responsibility rests on the Board of Customs and Excise of safeguarding the illicit use of alcohol, chemists have been represented on such commissions as that of the Industrial Alcohol Committee of 1905, whose recommendations led to the Revenue Act of 1906, in which the proportion of wood naphtha was reduced to 5 per cent., permission being also given for the payment of an allowance of 5d. per proof gallon or about 8d. per bulk gallon on British spirits used for industrial purposes, in consideration of the increased cost of the spirits owing to Excise restrictions.

Chemical Broker's Failure

THE first meeting of the creditors of Aristotle I. Poulot, chemical broker, late of 20, Bucklersbury, London, was held on August 8, at Bankruptcy Buildings, Carey Street, W.C. The chairman stated that the debtor had been bankrupt on a previous occasion in the High Court, a receiving order having been made against him on July 27, 1922, and he obtained his discharge in June, 1923, subject to his consenting to judgment for £5. He then again commenced business on his own account, a friend giving him £200 as a gift to enable him to make a start. In August, 1923, Perry and Hope purchased of him 2 tons of acetic acid, 80 per cent. technical strength, at £45 per ton, for which he received payment. Afterwards they said the acid was not in accordance with the bought note and their buyers had rejected it. They also said that some of the casks were leaky, but these were replaced by sound casks. They then complained that the strength was only 75 per cent. instead of 80 per cent. There was a clause in the agreement that in the event of a dispute the matter should go to arbitration, and the arbitrator awarded damages of £17 against the debtor, which he declined to pay. Judgment was obtained against him. Perry and Hope, Ltd., then joined Boake Roberts and Co., Ltd., who were creditors for £42, and jointly they filed the petition in bankruptcy against him. He returned his unsecured liabilities at £105 and assets nil. He attributed his failure to the transaction in acetic acid and to bad debts. The debtor was unable to make any offer of composition and the estate was left in the hands of the Official Receiver.

Glasgow Scientists' Wedding

THE marriage took place at Glasgow, on August 12, of Miss Eva Sarah Ellen Coleman, B.Sc., daughter of Mr. W. H. Coleman, F.I.C., M.I.Min.E., and Mrs. Coleman, London, to Mr. William Murdock Cumming, D.Sc., F.I.C.

Miss Coleman was assistant for five years to the Professor of Organic Chemistry at the University of Glasgow. Dr. Cumming received his earlier training at the Universities of Glasgow and Leeds, and for five years during the war he was engaged on the research and technical staffs of British Dyestuffs Corporation (Limited), which appointment he resigned to take up his present post as Senior Lecturer on Organic Chemistry at the Royal Technical College, Glasgow. He is joint author of a large text-book on practical organic chemistry, published last year, which has been described as the best book of its kind in the language. An extensive exhibit of Dr. Cumming's research work is at present on view in the British Empire Exhibition at Wembley. He is secretary of the Glasgow and West of Scotland Section of the Institute of Chemistry. In June of this year the degree of Doctor of Science was conferred on him by the University of Glasgow.

Tariff Changes

UNION OF SOUTH AFRICA.—New Budget proposals include a duty of 2s. per 100 lb. of sodium carbonate. The present duty is 3 per cent. *ad valorem*, with a rebate of the whole duty when the manufacture of the U.K. or reciprocating British possessions.

BELGIUM.—A Bill modifying import duties on certain alcoholic and other products has now passed into law.

ESTHONIA.—Customs have been temporarily increased by various percentages.

From Week to Week

A MIXTURE OF PICRIC ACID AND VASELINE was used by boys at the Duke of York's camp for protecting their legs against the sun.

OVER 1,800 employees of J. Bibby and Sons, seed crushers and oil cake manufacturers, visited the British Empire Exhibition on Monday.

A NEW TYPE OF MICROSCOPE, with a double eye-piece, in which the object viewed stands out as with a stereoscope, is said to have been produced at the Leitz Optical Works at Wetzlar.

THE BAY SULPHITE CO., LTD., of Montreal, a pulp and paper concern organised by the British and French interests six years ago, has been taken over by the Port Arthur Pulp and Paper Corporation.

BARON COPPEE, a prominent Belgian industrialist, has been found not guilty, by the Brabant Assize Court, of supplying Germany, during the war, with by-products of coal, including benzol, from his mines.

SIR ALFRED STEPHENS, proprietor of Stephens and Co., silica brick manufacturers, Kidwelly, is fighting the by-election, in the Conservative interest, in the Carmarthen Division against Sir Alfred Mond.

A VERDICT of "Accidental Death" was returned at the inquest on Robert Smith, a labourer in the employ of the United Alkali Chemical Works, who on July 31 fell through the asbestos roof of a shed.

MR. HORACE LAMB, Professor of Mathematics at Trinity College, Cambridge, has been elected president of the British Association for 1925. Next year's meeting of the Association will be held at Southampton.

MR. E. E. FOURNIER D'ALBE, of Westgate House, Palace Road, Kingston, D.Sc. (London and Birmingham), and a scientific author, was, on Wednesday, summoned by his wife for assault. A fine of £5, and three guineas costs were imposed.

A NEW AUSTRIAN COMPANY is to be formed to take over the Austro-American Magnesite Co. at Radenthein, Carinthia. This company produces about 40 per cent. of the country's output of magnesite and the bulk of it is exported to America as calcined magnesite.

THE FIRST SILICA GEL PLANT for oil refining to be completed in England—the plant of the Medway Oil Refining Co.—is said to be in complete and satisfactory operation. It is reported that the company are negotiating for another plant of double the capacity.

DR. E. V. APPLETON has been appointed, as from August 1, 1924, to the Wheatstone Chair of Physics tenable at King's College. Since 1919 he has been supervisor in physics and mineralogy at St. John's College, Cambridge, of which he is a Fellow, and demonstrator and lecturer in the Cavendish Laboratory.

THE AMERICAN OIL CHEMISTS' SOCIETY has established a new quarterly journal which will be the official journal of the oil and fat industry in the United States. The new publication will deal with the chemical considerations of oils, fats and related materials such as oil meal feeds and fertilisers, paints, soaps, foods, and packing-house products.

SIR ERNEST RUTHERFORD, addressing the Toronto Rotary Club on August 8, paid a high tribute to the research work of Canadian scientists, especially in connection with the early discoveries made regarding the structure of matter and the arrangement of atoms, on which were based theories in chemistry and physics which were now revolutionising these sciences and giving promise of a tremendous effect on industrial life.

GRADUATE FELLOWSHIPS in mining, metallurgical and chemical research are offered by various American institutions in co-operation with the Bureau of Mines. The purpose of these fellowships is to undertake the solution of various problems being studied by the Bureau of Mines that are of especial importance to the regions in which the institutions of learning are located. They afford excellent opportunities for qualified young men to become experts in the fields of mining, metallurgy and chemical technology, and to prepare themselves for highly technical work in these fields.

FIRE BROKE OUT at the factory of the Jackson Co., manufacturing chemists, of 32, Great Dover Street, London, on Saturday, causing considerable damage.

DEATH RESULTING FROM LEAD POISONING was recorded at the inquest on Monday at Birmingham into the cause of the death of Thomas Henry Taft, a house painter.

IN ACCEPTING THE POSITION of Lord Mayor of Manchester for next year, Alderman F. G. West has announced his resignation as head of a firm of gas engineers, in order to devote his whole time to civic duties.

NEGOTIATIONS between the Becker Steel Works Company and a Belgian firm have been unsuccessful, and a German lignite firm are now negotiating. The liabilities of the Becker Company amount to 27½ million gold marks.

CHESTERFIELD CORPORATION proposed to carry out a new sewage purification scheme costing £82,000, and a Ministry of Health inquiry has been held into the application for a loan. The bio-aeration or Sheffield system will be adopted.

ALDERMAN C. H. WATERHOUSE, head of the firm of J. Waterhouse and Co., wholesale druggists and drysalters, died on August 12 at the age of 68. He was a borough and county magistrate and an ex-Mayor of Ashton-under-Lyne.

FIRE CAUSED CONSIDERABLE DAMAGE to the works of J. Mathews and Co., varnish, paint, and colour manufacturers, of Liverpool, on Wednesday. Thousands of gallons of oil, colours, and paint materials are said to have been destroyed.

ACCORDING TO THE CANADIAN TRADE COMMISSIONER, Brazil is importing more heavy chemicals. Among the lines which are in demand are acetate of lime, acetate of soda, sulphuric acid, ammonium sulphate, borax, soda ash, caustic soda, sodium sulphate and chemical fertilisers.

A SPECIAL CONVOCATION of the University of Toronto has conferred honorary degrees of Doctor of Science on Sir David Bruce, Sir Charles Parsons, Sir Edward Russell, Sir Ernest Rutherford, M. de la Valle Poussin, Signor F. Severi, M. Gabriel Kœniga, and Dr. W. S. Steffloff.

SIR WILLIAM BRAGG, speaking at Toronto on the commercial application of the new atomic theories, said that they might revolutionise the method of making steel, steel itself being an alloy, and science was now in a position to learn details, never before suspected, of the way in which the metal was formed.

THE BIENNIAL CONGRESS of Australasian scientists is to be held this year in Adelaide during the last week in August. It is held under the auspices of the Australasian Association for the Advancement of Science, with the co-operation of scientific societies and institutions throughout Australia and New Zealand, and embraces practically all scientific activities.

DR. JULIUS WERTHEIMER, Dean of the Faculty of Engineering at Bristol University, has died aged 66. He was previously headmaster of the Schools of Science and Technology at Leeds and principal of the Merchant Venturers' Technical College, Bristol. He was also a frequent contributor to scientific journals and was associated with various scientific societies.

IN ADDITION TO FREE SPACE offered to British exhibitors of mining and metallurgical manufactures at the Mining Industries Exhibition to be held in Lima, Peru, during the month dating from December 9, 1924, all such British manufactures will be admitted into the country free of Customs Duty, and all expenses attending disembarkation and transport of the manufactures will be defrayed by the Peruvian Government.

MR. W. A. WALMSLEY, manager of the Glasgow Corporation Chemical Works, states that the sale of products for the year ending May 31 amounted to £451,846 2s., and that the surplus revenue was £295,441 18s. 4d. The prospects for the financial year 1924-25 are not very promising. Both the sulphate of ammonia and tar products markets are depressed, and show no sign at the moment of revival. A slight tendency to lower values than is presently being obtained is noticeable, and there is very little forward buying going on in pitch and creosote oil. Under present conditions it is not possible to estimate the revenue for tar and ammonia products for the coming year at more than about £140,000.

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218,401. Fertilisers. M. Igawa, 16, Naka-Rokuban-cho, Kojimachi-ku, Tokio, and Asahi Garasu Kabushiki Kaisha, 1, Eiraku-cho 1-chome, Kojimachi-ku, Tokio, Japan. Application date, December 21, 1922.

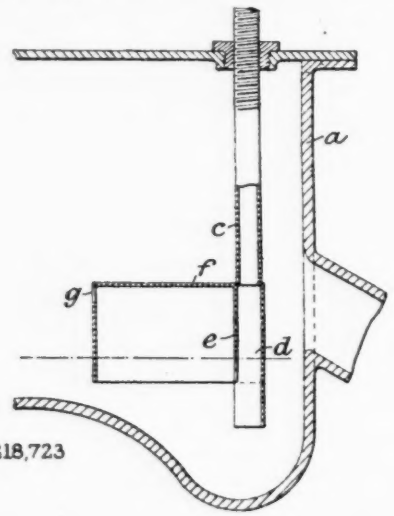
The usual nitrogenous fertilisers are improved by the addition of colloidal magnesium silicate, which retains the soluble salts, particularly potassium salts. The quantity used varies with the area to be treated and not with the quantity of fertiliser to be used, *e.g.*, 1 lb. of magnesium silicate is sufficient for two and a half acres of ground.

218,694. Concentrated Sulphuric Acid, Process and Means for the Production of. A. W. Cowburn, of W. H. Cowburn and Cowpar, Ltd., Westinghouse Road, Trafford Park, Manchester. Application date, January 10, 1923.

A sulphur burner furnace is combined with a series of acid pans for concentrating sulphuric acid, and the hot gases are passed under the evaporating pans to heat them. The gases then pass to the Glover tower. The pans are enclosed, so that the steam may be passed into the Glover tower, and the acid contents of the steam are thereby recovered. Reference is directed in pursuance of Section 7, Sub-section 4 of the Patents and Designs Acts of 1907 and 1919, to Specifications No. 3,774/1879 and 1,066/1904.

218,723. Heating Liquids by Introduction into Molten Metal. Thermal, Industrial and Chemical (T.I.C.) Research Co., Ltd., D. Rider, and J. S. Watts, 52, Grosvenor Gardens, London, S.W.2. Application date, April 7, 1923. Addition to 170,617.

Specification No. 170,617 (see The Chemical Age, Vol. V, p. 708) describes an apparatus for treating liquids by introducing them through a hood beneath the surface of molten



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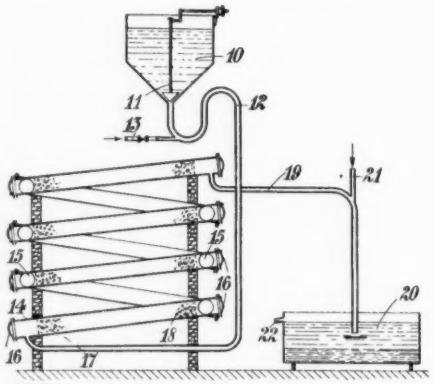
metal in the form of thin streams. It has been found that with this apparatus, the liquid rising to the surface of the metal carries into the air small globules of molten metal, which thus become solidified. These globules are coated with the liquid and tend to float on the surface of the molten metal without entering it again. The globules are thus carried away with the treated liquid. To avoid this, the liquid to be treated, *e.g.*, oil, is pumped through a pipe *c* into a long narrow inverted box *d*, the front wall *e* of which is shorter than the rear wall, and the lower edge which dips into the molten metal is serrated. The oil which issues through these serrations rises into a wider inverted box *f*, having a slot *g* at the top of its front wall. The solidified globules of metal collect in the box *f* until the lower layers are depressed into the molten metal, and are reabsorbed into it. The oil overflows through the slot *g* on to the surface of the molten metal in the still *a*.

218,747. Bleaching of Kaolin and the Like. R. F. B. Gaudin, 8, Elliot Terrace, Plymouth, and The Dartmoor China Clay Co., Ltd., 11, Queen Victoria Street, London, E.C.4. Application date, April 12, 1923.

Kaolin is made into an aqueous pulp containing sulphurous acid, and is then passed over an extended surface of zinc, or through a pipe containing pieces of zinc without access of air. The sulphurous acid is preferably of a strength of 2-2·5 per cent.

In one form of apparatus, the pulp passes from a tank 10 through a pipe 12, having an inlet 13 for sulphur dioxide gas.



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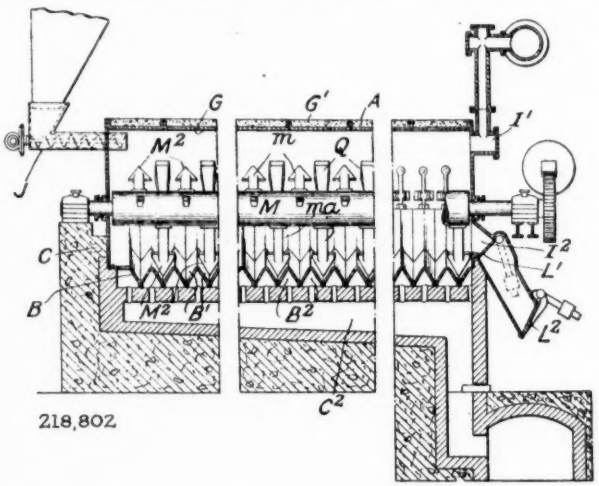
The mixture then passes to the bottom of an ascending zigzag pipe 14, having a number of inclined sections containing scrap zinc, connected by cross passages 15. The mixture then passes through a pipe 19 to a settling tank 20. Wash water is introduced through the pipe 21, and the bleached clay settles at the botton of the tank 20. In an example, a sample of china clay containing 0·71 per cent. of iron was made into an aqueous pulp containing 70 per cent. of clay, and a solution of sulphur dioxide containing 2 per cent. of sulphur dioxide was added in sufficient quantity to introduce 0·35 per cent. of sulphur dioxide on the weight of the clay. The mixture was in contact with the zinc for 5–10 minutes, and was then washed with water until the mixture contained 2·5 per cent. of clay. The clay is completely bleached by this treatment. In another form of apparatus, the pulp trickles downwards through a chamber packed with zinc, and in another form the pulp may flow over a grid or other openwork structure of zinc plates or wires, the surfaces of which are steeply inclined to prevent choking with clay.

218,793. Phenol-Formaldehyde Condensation Products, Process for Production of. Indurit Products Co., Ltd., 4A, St. Andrews Square, Edinburgh, and J. G. Fairgrieve, Cherry Cottage, Uddingston, Lanarkshire. Application date, May 15, 1923.

In the manufacture of phenol-formaldehyde condensation products, it is found that some filling materials are difficult to incorporate with the mixture, and substances for accelerating the condensation cannot be distributed uniformly through the material. It is found that these difficulties can be overcome by effecting the condensation in the presence of cellulosic material containing a substantial proportion of oxycellulose and also lime and chlorine in the form of hypochlorites. A suitable material is obtained from the woody and resinous constituents such as lignine, resins, tannin, pectine, etc., which are removed from esparto grass by digesting with caustic soda. The digestive material is treated with lime and chlorine and strained, and the fine particles contain oxycellulose and hypochlorites. When this material is used as a filler with phenol-formaldehyde a uniform product is obtained. The filling material contains 4–7·5 per cent. of lime, and 0·5–1 per cent. of hypochlorites. The filling material employed is a waste product obtained from the effluent water of esparte paper mills, in which bleaching powder has been used.

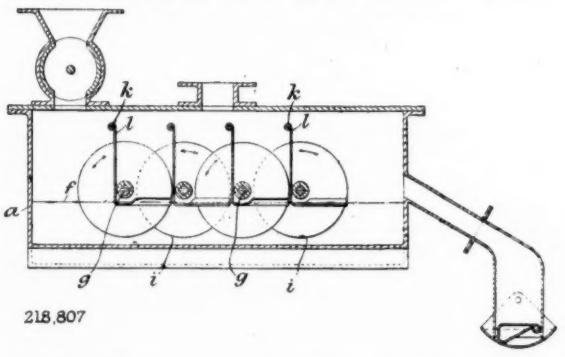
218,802. RETORT FURNACE. C. V. McIntyre, 66, Broadway, New York. Application date, May 22, 1923.

The apparatus is more particularly for the low-temperature distillation of coal at about 900° F. A horizontal stationary retort A is constructed with its lower part B in the form of a half cylinder corrugated to provide alternate internal and external grooves B^1, B^2. The part B is mounted in a refractory setting C, which may be of reinforced concrete lined with fire brick. The retort is heated by burners which project tangentially into the arc-shaped flues B^2 at their upper ends, and the combustion products are discharged at the lower part of the flues into a common off-take C^2. The upper part of the retort is formed by a removable metal cover G, having heat insulating covering G^1. The coal or other material to be treated is fed into the retort by a screw conveyor J, and the gas is drawn off through an outlet I^1. The semi-coke or other non-volatile residue is discharged through an outlet I^2 having gravity-closed doors L^1, L^2. An oscillating stirrer M carries two sets of radial stirrer arms *m*, *ma*, each having at its outer end a paddle M^2 having its opposite edges inclined to correspond with the grooves B^1. The stirrer shaft is oscillated through an angle of about 270° C., and the stirrer continuously agitates the charge and also feeds it longitudinally through the retort. The stirrer arms operate between radial projections such as Q on opposite side of the retort, which prevent the charge caking around the stirrer arms. The corrugated form of the retort gives a large heating surface, so that there may be a comparatively rapid flow of gas through the short flues B^2. Another form of retort with corrugated walls is described, in which the retort is continuously rotated.



218,802

218,807. HEAT TREATMENT OF MATERIALS BY MEANS OF MOLTEN METAL, APPARATUS FOR. Thermal, Industrial and Chemical (T.I.C.), Research Co., Ltd., and D. Rider, 52, Grosvenor Gardens, London, S.W.1. Application date, June 4, 1923. Addition to 174,974.



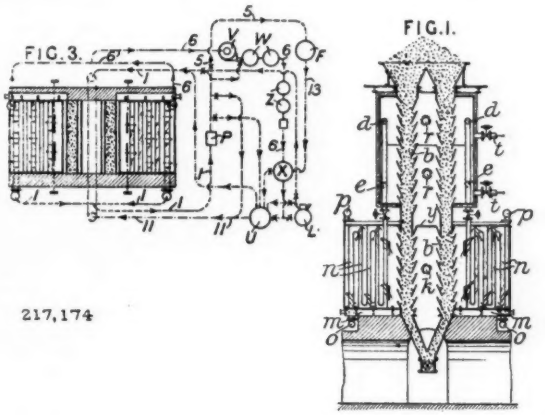
218,807

Specification No. 174,974 (see THE CHEMICAL AGE, Vol. VI, p. 352) describes an apparatus for heating or cooling material by means of molten metal, in which the material is drawn below the surface by means of a drum or disc dipping into the metal, but which is not wetted by it. The present apparatus renders it possible to subject the material to the action of the metal for a longer period. The apparatus shown is suitable for destructively distilling sub-divided solid material. The still *a* contains molten metal to the level *f*, and just above this level transverse shafts *g* are mounted each of them carrying a number of discs *i*. The discs are arranged so that those on each shaft pass into the spaces of those on the adjacent shaft. Above the discsbars *k* aie fixed, carrying depending L-shaped scrapers *l*. Each scraper consists of a strip of metal of width equal to the distance between two discs, and the horizontal portion is just below the surface of the metal. This portion is forked, and the inner edges of the fork are bent upward to receive a disc on the adjacent shaft. The outer edge of each prong thus forms a knife edge, scraping the surface of the disc, and the inner edge forms a guide to feed the material to the next disc. The discs afford a large surface for conveying the material in the form of thin films through the molten metal.

International Specifications not yet Accepted

217,174. DESTRUCTIVE DISTILLATION. E. Hinselmann, Königswinter-on-Rhine, Germany. International Convention date, June 6, 1923.

Fuel or oil shale is passed through retorts *b*, *b* with perforated sides, the upper end of the retort effecting the drying, and the lower end the distilling of the fuel. Hot gas is supplied to heat these zones through pipes *r*, *k*, respectively, the heating flues being separated by a partition *y*. Steam and gas from the drying zone pass through pipes *d*, *e*, to a superheater *n*, while the hot distillates from the lower end of the retort pass over the superheater *n* to the outlet *p*. The superheated steam and gas pass to a pump P and thence to the drying flues of the retort. Surplus gases pass to a separate superheater U and are heated to 450°–550° C. and then passed to the pipes *k* for the distilling stage; and any further surplus passes to a generator F. The distillate is cooled in the superheater *n*, and then passes through washer V, coolers W, and benzene extractors Z to a gas holder X. This gas may then be used to heat the superheater U.



217,174

217,183. PURIFYING HYDROGEN; SODIUM BICARBONATE. Soc. Chimique de la Grande-Paroisse (Azote et Produits Chimiques), 13, Rue des Saussaies, Paris. International Convention date, June 4, 1923.

Hydrogen is scrubbed with ammoniacal liquor produced in the ammonia-soda process of the Schrieb type to free it from carbon dioxide and sulphuretted hydrogen. The liquor thus obtained is used for the manufacture of ammonium chloride and sodium bicarbonate, and may then be mixed with more ammonia to treat a further quantity of hydrogen containing a considerable proportion of carbon dioxide, which is obtained from water gas. If the hydrogen is obtained from coke oven gas, only a little carbon dioxide is present, and sodium chloride is added instead of ammonia. The ammonia which is present in the purified hydrogen is absorbed by water or sulphuric acid in a washer.

217,546. NITRIC ACID. Deutsche Celluloid-Fabrik, Eilenburg, Germany. International Convention date, June 15, 1923.

Dilute nitric acid is heated and mixed with a small quantity of sulphuric acid and passed over pyrites to reduce the nitric acid. Nitric oxide is liberated, and is mixed with air and absorbed to yield a stronger nitric acid.

217,554. DISTILLING SOLID FUEL. C. B. Wisner, 1125, Cleveland Avenue, Canton, Ohio, U.S.A. International Convention date, June 11, 1923.

This process is for distilling wood, peat, lignite, coal, oil shale, etc. The fuel is heated rapidly to the point at which hydrocarbon vapours are evolved, and then more slowly to continue the distillation. In the case of bituminous coal, the fuel may be preheated to 400°-550° F. in a current of air to prevent caking during the distilling operation, which may be at 700°-900° F. The rate of heating may be 16° F. per minute up to 640° F. and then 25° F. per minute. The fuel is preheated and distilled in two separate rotary retorts, and the hot distillation gases are employed to preheat the fuel.

217,568. ALUMINA AND ALUMINIUM CHLORIDE. Höganäs Billesholms Aktiebolag, Höganäs, Sweden. International Convention date, June 15, 1923.

Clay, argillaceous slate, or bauxite is treated with hydrochloric acid, and aluminium chloride is precipitated by means of hydrochloric acid gas. The crystals are calcined to yield alumina, and the mixture of hydrochloric acid and steam liberated is used to precipitate more aluminium chloride. The mother liquor remaining is used to dissolve more raw material, the rate of solution of alumina being equal to the rate of precipitation of aluminium chloride. The raw material is treated at 60°-100° C., and the aluminium chloride solution may be sprayed into the hydrochloric acid gas to precipitate the crystals.

217,570. IRON SULPHIDE. E. Mandowsky, 12, Liberdastrasse, Neukölln, Berlin. International Convention date, May 13, 1923.

Hydrated iron oxide, which may be iron ore, or material recovered from gas purifier waste, is mixed with sulphur, and may then be liquefied for casting in moulds.

217,595. SYNTHETIC RESINS. V. P. Mehta, New York. International Convention date, June 12, 1923.

A mixture of phenol, formaldehyde, glycerine, and caustic alkali, preferably caustic potash, is heated under a vacuum of 29·5-30 inches, yielding an oily liquid. This is poured into moulds, and again heated under vacuum to solidify it, and the product is then baked at 150° C. *in vacuo* or under normal pressures. Light coloured products are obtained, but if small quantities of ammonia are also added, the products are amber-coloured.

217,598. ALKALI BICARBONATES, POTASSIUM CHLORIDE, AND AMMONIUM NITRATE. Cosmic Arts, Inc., 6, West 48th Street, New York. Assignees of A. Lambert, 116, West 4th Street, New York. International Convention date, June 12, 1923.

Mexican natural waters containing sodium chloride, sulphate sesquicarbonate, and bicarbonate, are treated at 28° Bé with carbon dioxide with or without ammonia to precipitate sodium bicarbonate. In the latter case, the suspension is brought to 33·3° C. to free the bicarbonate from sulphate. Alsatian sylvenite, containing sodium and potassium chlorides is treated by the ammonia-soda process to obtain sodium bicarbonate. The liquor containing potassium and ammonium chlorides may be evaporated to obtain a fertilizer. Chilian nitrate liquor of 38° Bé may be treated with ammonia and carbon dioxide at 33° C. to obtain sodium bicarbonate and ammonium nitrate.

LATEST NOTIFICATIONS.

219,922. Manufacture of alkyl resorcinols. Sharp and Dohme, Inc. July 31, 1923.

219,926. Process of manufacturing cellulose esters. Soc. de Stearinerie et Savonnerie de Lyon. July 31, 1923.

219,971. Process of producing soluble carbonates or hydroxides from insoluble carbonates, oxides, or hydroxides. Meyerhofer, A. F. August 2, 1923.

219,983. Process of separating hafnium and zirconium. Naamlooze Vennootschap Philips' Gloeilampenfabrieken. July 30, 1923.

Specifications Accepted with Date of Application

196,624. Fractional distillation of petroleum and similar liquid hydrocarbons. Brünn-Königsfelder Maschinenfabrik der Maschinen-und Waggonbau-Fabriks-Akt.-Ges., in Simmering, vorm. H. D. Schmid and K. Fuchs. April 22, 1922.

208,516. Nitrogen and acetone from molasses and vinasses, Process for the recovery of. Syndicat d'Etudes Chimiques. December 15, 1922.

214,940. Obtaining valuable hydrocarbons from material of inferior value, Process and apparatus for. G. Linnmann. April 24, 1923.

219,346. Aluminium alloys. British Aluminium Co., Ltd., A. G. C. Gwyer, and H. W. L. Phillips. January 22, 1923.

219,347. Tanning and manufacture of tanning materials. J. and W. N. Hutchings, Ltd., and J. A. S. Morrison. January 24, 1923.

219,348. Obtaining stable aqueous emulsions of pitch and other unsaponifiable matters. F. C. Thornley, F. F. Tapping, and O. Reynard. January 26, 1923.

219,349. Dyeing or colouring of products made with cellulose acetate. British Celanese, Ltd., and G. H. Ellis. January 27, 1923.

219,351. Refining commercial benzol, Process of. P. G. Somerville and E. C. Williams. February 23, 1923.

219,359. Purification of gases, Process for. M. Krafft. March 19, 1923.

219,384. Nitrogenous fertilizers, Manufacture of. E. H. Richards, H. B. Hutchinson, and Agricultural Developments Co. (Pyrford), Ltd. April 23, 1923.

219,403. Cracking of oils. V. L. Oil Processes, Ltd., and O. D. Lucas. April 26, 1923.

219,404. Cracking of oils. V. L. Oil Processes, Ltd., O. D. Lucas, and E. L. Lomax. April 26, 1923.

219,420. Waste lime from chemical works, Utilisation of. E. Smith. May 5, 1923.

219,423. Zinc oxide, Manufacture of. W. J. Mellersh-Jackson. (*New Jersey Zinc Co.*) May 8, 1923.

219,494. Gas or oil heated smelting furnaces. P. Baumert. July 27, 1923.

Applications for Patents

Arthars, H., Birmingham Small Arms Co., Ltd., and Nicholls, R. Oil pumps. 18,557. August 5.

Baird, R. T., and Corthesy, J. H. Rotary pumps, etc. 18,965. August 9.

Bock, J. Kerr-, and Spearing, K. A. Apparatus for softening water. 18,969. August 9.

Campbell, F. H. Manufacture of white lead. 18,914. August 8.

Cassella and Co., Ges., L., and Ransford, R. B. Manufacture of 4-amino-3-oxybenzene-1-arsinic acids. 18,739. August 6.

Cassella and Co., Ges., L., and Ransford, R. B. Manufacture of arsinic acids of the aromatic series. 18,740. August 6.

Feldenheimer, W. Processes for improving colour, etc., of clays. 18,837, 18,838. August 7.

Goldschmidt Akt.-Ges., T. Production of paints. 18,749. August 6. (Germany, August 9, 1923.)

Harris, H. Treatment of molten metals or alloys for separation or purification purposes. 18,919. August 8.

Kinney, J. R. Rotary pumps. 18,593. August 5.

Kohlenscheidungs Ges. Distilling bituminous substances at a low temperature. 18,716. August 6. (Germany, November 24, 1923.)

Kohlenscheidungs Ges. Refining tar. 18,717. August 6. (Germany, November 28, 1923.)

Lloyd, G. F. Manufacture of white lead. 18,914. August 8.

Minerals Separation, Ltd. Manufacture of fuel briquettes. 18,750. August 6.

Naugatuck Chemical Co. Process for treating rubber. 18,815. August 7. (United States, August 8, 1923.)

Naugatuck Chemical Co. Processes for retarding deterioration of rubber, etc. 18,825. August 7. (United States, August, 8, 1923.)

Rhodes, Brydon, and Youatt, Ltd. Centrifugal pumps. 18,828. August 7.

Sheffield, J. Manufacture of salt. 18,544. August 5.

Soc. l'Air Liquide, Soc. Anon. pour l'Etude et l'Exploitation des Procédés G. Claude. Purification of coke-oven gases, etc. 18,793. August 7. (France, November 17, 1923.)

Unger, N. A. Safety Explosives. 18,715. August 6. (Sweden, August 18, 1923.)

Wayne Tank and Pump Co. Water softening apparatus. 18,616. August 5. (United States, April 4.)

Youatt, C. S. Centrifugal pumps. 18,828. August 7.

London Chemical Market

The following notes on the London Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing those firms' independent and impartial opinions.*

London, August 14, 1924.

MARKETS continue more or less under the influence of the holiday season, and little improvement is shewn in the demand; prices on the whole continue steady. Export trade has been a little brisker, but still leaves a good deal to be desired.

General Chemicals

ACETONE has been in fair demand and price is firm with a higher tendency; to-day's value is round about £100 per ton.

ACID ACETIC continues easy and in poor request. Technical is £43 per ton carriage paid, and pure £43 per ton ex wharf.

ACID CITRIC.—Unchanged at 1s. 5½d. per lb less 5% with little demand.

ACID FORMIC has been called for, but price unchanged; 85% is quoted at £55 per ton, carriage paid.

ACID LACTIC.—The demand is a little better and value is unchanged at £38 per ton, for 50% by volume, and £43 per ton for 50% by weight.

ACID OXALIC has been in better request, and the price is steady at 4½d. per lb. ex warehouse.

ACID TARTARIC is in slightly better demand, and English make is offered at 1s. 1½d. per lb. less 5%; foreign can be obtained slightly cheaper for forward delivery.

ARSENIC.—A little more inquiry has been in evidence on export account, but price remains unchanged at about £45 per ton.

BARIUM CHLORIDE has been in very active demand and the price is firm at £14 10s. to £15 per ton.

COPPER SULPHATE has been somewhat neglected, although some small business is reported for next season. The present value is about £23 per ton.

CREAM OF TARTAR.—Only a moderate demand, with the market fairly easy, at 81s. per cwt. less 2½%.

EPSOM SALTS has been extremely active, and technical is quoted at £4 15s. to £5 per ton.

FORMALDEHYDE.—The demand still leaves a good deal to be desired, and the material is offered at round about £54 per ton delivered.

LEAD ACETATE has been a very bright spot and the price is firm at £47 per ton.

LIME ACETATE.—Only small business is reported at the present value of £19 10s. per ton.

POTASSIUM PRUSSIATE.—Has been much more active and the price is firm at 7½d. to 7¾d. per lb., with an upward tendency.

POTASSIUM PERMANGANATE.—Moderate business is reported, and the price is steady at 8d. per lb.

SODIUM ACETATE.—Is rather featureless, and is fairly easy at £24 per ton.

SODIUM HYPOSULPHITE.—British make has been reduced in price and the average value is now about £9 10s. per ton, according to quantity and position. Demand is fair.

SODIUM NITRITE.—Is slightly easier at £25 10s. to £26 per ton. Demand fair.

SODIUM PRUSSIATE.—Better business is reported and the price is very steady at 4¼d. to 4½d. per lb.

SODIUM SULPHIDE.—Is unchanged in value and in good request at £14 per ton for concentrated.

Coal Tar Products

The quiet tone of the market in coal tar products is maintained, and there is little fresh inquiry.

90% BENZOL is steady at about 1s. 6½d. to 1s. 7d. per gallon on rails.

PURE BENZOL remains unchanged at about 1s. 11d. to 1s. 11½d. per gallon on rails.

CREOSOTE OIL is stationary at 5¾d. to 6d. per gallon on rails in the north, and 6½d. to 6¾d. per gallon in London.

CRESYLIC ACID is also inactive, the 97/99% pale quality being quoted at 2s. to 2s. 0½d. per gallon. f.o.r., while the dark quality, 95/97%, is worth about 1s. 9d. per gallon on rails.

SOLVENT NAPHTHA is steady at 11½d. to 1s. per gallon on rails.

HEAVY NAPHTHA is quoted at 1s. to 1s. 1d. per gallon on rails.

NAPHTHALENES are in slightly better demand, with no improvement in price, supplies remaining plentiful; 76/78 quality is worth from £7 to £7 10s. per ton; 74/76 quality from £6 to £6 10s. per ton, while the lower grades are quoted from £4 10s. to £5 per ton.

PITCH remains dull and prices are unchanged.

Sulphate of Ammonia

The demand is satisfactory and prices are well maintained.

Nitrogen Products Market

THE position in the sulphate of ammonia market can be described as steady with an upward tendency.

Large sales have been made for prompt delivery for France and Spain, and considerable business has been done for the same delivery at about £13 per ton f.o.b. U.K. port for the Colonies.

Business has also been done for forward delivery at prices slightly in advance. These sales, together with the reported decline in the production in the United States, have given a distinctly firmer tone to the market.

The Reparations Commission, which has given a hope of more stable exchanges, has also had an effect.

HOME TRADE.—The demand for home agricultural use is normal for this period of the year.

NITRATE OF SODA.—The nitrate of soda market is unchanged, prices c.i.f. European ports for spot delivery being £11 10s.–£12 per ton.

July Trade Returns

JULY trade returns reveal a welcome all-round increase, not only with the previous month's trade, but with the corresponding period last year. Interesting figures in imports are—Chemicals, drugs, dyes, and colours, £1,146,410, an increase over July, 1923, of £352,994: oils, fats, and resins (manufactured), £4,881,431, an increase of £41,236,497. Imports of petroleum in galls. were 135,725,341, as compared with 104,616,287 for July last year. Painters' colours, in cwts., totalled 163,249, against 102,872 last year.

Exports of chemicals, drugs, dyes, and colours totalled £2,207,457, an increase of £468,121 over July, 1923; oils, fats, and resins (manufactured) registered £822,511, an increase of £305,123. As regards specific products the following may be noted: Coal tar pitch (tons), 1,563, decrease of 2,979; soda compounds (cwts.), 881,567, increase of 112,079; dyestuffs (cwts.), 16,097, decrease of 3,226; painters' colours (cwts.), £41,038, increase of 13,349; soap (cwts.), 135,123, increase of 44,151. The usual detailed schedule of trade statistics for July will appear next week.

"Roebaryt"

A NEW X-Ray "meal" is now being put on the market in this country under the name of "Roebaryt." This is a barium sulphate preparation specially designed to overcome the defects of pure barium sulphate itself whilst still retaining all its advantages and relative cheapness. It is manufactured by the Saccharin-Fabrik A.G., vorm. Fahlberg, List and Co., Magdeburg-Suedost, and has been described by medical authorities in Germany as the best medium yet produced. The Saccharin-Fabrik have for many years been regarded as leading specialists in many barium salts and are themselves one of the chief producers of the pure barium sulphate for X-Ray work so far employed. After prolonged research work, however, they have evolved this preparation, "Roebaryt," which they consider in every way better than barium sulphate itself. Messrs. Ronsheim and Moore, 11A, Wormwood Street, London, the sole agents for this country, offer to supply further details, prices, and free samples on application.

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at sellers' works.

General Heavy Chemicals

All grades of Boric Acid have been reduced by £3 per ton as from June 11. Borax prices remain unchanged. Prices remain generally steady.

Acid Acetic 40% Tech.—£23 10s. per ton.
Acid Boric, Commercial.—Crystal, £45 per ton. Powder, £47 per ton
Acid Hydrochloric.—3s. 9d. to 6s. per carboy d/d., according to purity, strength and locality.
Acid Nitric 80° Tw.—£21 10s. to £27 per ton, makers' works, according to district and quality.
Acid Sulphuric.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations: 140° Tw., Crude Acid, 65s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.
Ammonia Alkali.—£6 15s. per ton f.o.r. Special terms for contracts.
Bleaching Powder.—Spot, £11 d/d.; Contract, £10 d/d. 4 ton lots.
Bisulphite of Lime.—£7 per ton, packages extra.
Borax, Commercial.—Crystal, £25 per ton. Powder, £26 per ton. (Packed in 2-cwt. bags, carriage paid any station in Great Britain.)
Calcium Chloride.—£5 17s. 6d. per ton d/d.
Methylated Spirit 64 O.P.—Industrial, 3s. 1d. to 3s. 5d. per gall. Mineralised, 4s. 2d. to 4s. 6d. per gall., in each case according to quantity.
Potash Caustic.—£30 to £33 per ton.
Potassium Bichromate.—5¾d. per lb.
Potassium Chlorate.—3d. to 4d. per lb.
Salammoniac.—£32 per ton d/d.
Salt Cake.—£3 10s. per ton d/d.
Soda Caustic, Solid.—Spot lots delivered, £16 7s. 6d. to £19 7s. 6d. per ton, according to strength; 20s. less for contracts.
Soda Crystals.—£5 5s. to £5 10s. per ton ex railway depots or ports.
Sodium Acetate 97/98%.—£24 per ton.
Sodium Bicarbonate.—£10 10s. per ton carr. paid.
Sodium Bichromate.—4¼d. per lb.
Sodium Bisulphite Powder 60/62%.—£18 to £19 per ton according to quantity, f.o.b., 1-cwt. iron drums included.
Sodium Chlorate.—3d. per lb.
Sodium Nitrate refined 96%.—£13 5s. to £13 10s. per ton, ex Liverpool. Nominal.
Sodium Nitrite 100% basis.—£27 per ton d/d.
Sodium Sulphide conc. 60/65.—About £14 10s. per ton d/d.
Sodium Sulphide Crystals.—£9 per ton d/d.
Sodium Sulphite, Pea Crystals.—£15 per ton f.o.r. London, 1-cwt. kegs included.

Coal Tar Products

Prices in this section show some irregularity, according to district. In the north-eastern counties, for instance, anthracene oil, solvent naphtha, and naphthalenes are cheaper than in Lancashire or London. On the other hand, crude carbolic and creosote are dearer.

Acid Carbolic Crystals.—6½d. to 6¾d. per lb. Quiet. Crude 60's, 1s. 9d. to 1s. 11d. per gall., according to district. Still quiet.
Acid Cresylic 97/99.—2s. 1d. to 2s. 2d. per gall. Demand still good. Market firm. Pale 95%, 1s. 10d. to 1s. 11d. per gall. Steady demand. Dark, 1s. 10d. to 1s. 11d. per gall. Steady business.
Anthracene Paste 40%.—4d. per unit per cwt. Nominal price. No business.
Anthracene Oil, Strained.—8d. to 9d. per gall. Quiet. Unstrained, 7d. to 8d. per gall.
Benzol.—Crude 65's.—10½d. to 1s. per gall., ex works in tank wagons. Standard Motor, 1s. 4½d. to 1s. 6d. per gall., ex works in tank wagons. Pure, 1s. 8½d. to 1s. 10d. per gall., ex works in tank wagons.
Toluol.—90%, 1s. 5½d. per gall. Pure, 1s. 8d. to 2s. per gall.
Xylol Commercial.—2s. 3d. per gall. Pure, 3s. 3d. per gall.
Creosote.—Cresylic, 20/24%, 9d. to 9½d. per gall. Few inquiries. Middle Oil, Heavy, 5½d. to 6d. per gall. in Lancashire. Standard specification, 6d. to 7d. per gall. in Yorkshire.
Naphtha.—Crude, 8d. to 9d. per gall. Solvent 90/160, 1s. 1d. to 1s. 4d. per gall., according to district. Quiet. Solvent 90/190, 1s. 1d. to 1s. 4d. per gall. Quiet.
Naphthalene Crude.—Drained Creosote Salts, £4 to £6 per ton. Quiet. Whizzed or hot pressed, £9 per ton. Little business.
Naphthalene.—Crystals and Flaked, £13 to £16 per ton in Yorkshire and London respectively. More inquiries.
Pitch.—Medium soft, 55s. to 60s. per ton, f.a.s. for next season. Frequent inquiries.
Pyridine.—90/160, 17s. 6d. per gall. Market less firm. Heavy, 12s. to 12s. 6d. Little business.

Intermediates and Dyes

There has been a fair demand for dyestuffs during the past week. Prices remain constant. A number of intermediate products have been reduced in price.

In the following list of Intermediates delivered prices include packages except where otherwise stated.

Acetic Anhydride 95%.—1s. 7d. per lb.
Acid H.—4s. per lb. 100% basis d/d.
Acid Naphthionic.—2s. 4d. per lb. 100% basis d/d.
Acid Neville and Winther.—5s. 8d. per lb. 100% basis d/d.
Acid Salicylic, technical.—1s. 1d. per lb. Improved demand.
Acid Sulphanilic.—9½d. per lb. 100% basis d/d.
Aluminium Chloride, anhydrous.—1s. per lb. d/d.
Aniline Oil.—7¾d. to 8½d. per lb. naked at works.
Aniline Salts.—7¾d. to 9d. per lb. naked at works.
Antimony Pentachloride.—1s. per lb. d/d.
Benzidine Base.—4s. 6d. per lb. 100% basis d/d.
Benzyl Chloride 95%.—1s. 1d. per lb.
p-Chlorphenol.—4s. 3d. per lb. d/d.
p-Chloraniline.—3s. per lb. 100% basis.
o-Cresol 19/31° C.—4½d. per lb. Demand steady.
m-Cresol 98/100%.—2s. 1d. to 2s. 3d. per lb. Demand moderate.
p-Cresol 32/34° C.—2s. 1d. to 2s. 3d. per lb. Demand moderate.
Dichloraniline.—2s. 3d. to 3s. per lb.
Dichloraniline S. Acid.—2s. 6d. per lb. 100% basis.
p-Dichlorbenzol.—£85 per ton.
Diethylaniline.—4s. 6d. per lb. d/d., packages extra, returnable.
Dimethyaniline.—2s. 3d. per lb. d/d. Drums extra.
Dinitrobenzene.—9d. per lb. naked at works.
Dinitrochlorbenzol.—£84 10s. per ton d/d.
Dinitrotoluene.—48/50° C. 8d. to 9d. per lb. naked at works. 66/68° C. 1s. 2d. per lb. naked at works.
Diphenylaniline.—2s. 10d. per lb. d/d.
Monochlorbenzol.—£63 per ton.
B-Naphthol.—1s. 1d. per lb. d/d.
a-Naphthylamine.—1s. 4d. per lb. d/d.
B-Naphthylamine.—4s. per lb. d/d.
m-Nitraniline.—4s. 9d. per lb. d/d.
p-Nitraniline.—2s. 3½d. per lb. d/d.
Nitrobenzene.—5½d. to 5¾d. per lb. naked at works.
o-Nitrochlorbenzol.—2s. per lb. 100% basis d/d.
Nitronapthalene.—10½d. per lb. d/d.
p-Nitrophenol.—1s. 9d. per lb. 100 % basis d/d.
p-Nitro-*o*-amido-phenol.—4s. 6d. per lb. 100% basis.
m-Phenylene Diamine.—4s. per lb. d/d.
p-Phenylene Diamine.—10s. 3d. per lb. 100% basis d/d.
R. Salt.—2s. 6d. per lb. 100% basis d/d.
Sodium Naphthionate.—2s. 3d. per lb. 100% basis d/d.
o-Toluidine.—8½d. per lb.
p-Toluidine.—3s. 3d. per lb. naked at works.
m-Toluylene Diamine.—4s. 3d. per lb. d/d.

Wood Distillation Products

All prices keep fairly stable, but there is room for improvement in business.

Acetate of Lime.—Brown, £14 10s. per ton d/d. Demand active. Grey, £19 to £20 per ton. Fair demand. Liquor, 9d. per gall. 32° Tw.
Charcoal.—£7 5s. to £9 per ton, according to grade and locality. Demand below normal.
Iron Liquor.—1s. 7d. per gall. 32° Tw. 1s. 2d. per gall. 24° Tw.
Red Liquor.—10d. to 1s. per gall. 14/15° Tw.
Wood Creosote.—2s. 7d. per gall. Unrefined.
Wood Naphtha, Miscible.—5s. per gall. 60% O.P. Market dull. Solvent, 5s. 6d. per gall. 40% O.P. Fairly good demand.
Wood Tar.—£5 per ton.
Brown Sugar of Lead.—£46 per ton.

Rubber Chemicals

Antimony Sulphide.—Golden, 5¾d. to 1s. 4d. per lb., according to quality. Crimson, 1s. 3d. to 1s. 6d. per lb., according to quality.
Arsenic Sulphide, Yellow.—1s. 11d. per lb.
Barytes.—£3 10s. to £6 15s. per ton, according to quality.
Cadmium Sulphide.—3s. 9d. per lb.
Carbon Bisulphide.—£24 to £26 per ton, according to quantity.
Carbon Black.—7d. per lb., ex-wharf. Dearer.
Carbon Tetrachloride.—£56 per ton, drums free.
Chromium Oxide, Green.—1s. 3d. per lb.
Indiarubber Substitutes, White and Dark.—4¼d. to 6½d. per lb. Demand very brisk. Prices likely to remain steady owing to firmness of rapeseed oils.
Lamp Black.—45s. per cwt., barrels free.
Lead Hyposulphite.—7½d. per lb.

Lithopone, 30%.—£22 10s. per ton.
Mineral Rubber "Rubpron."—£15 10s. per ton f.o.r. London.
Sulphur.—£10 to £12 per ton, according to quality.
Sulphur Chloride.—3d. per lb., carboys extra.
Thiocarbanilide.—2s. 6d. per lb.
Vermilion, Pale or Deep.—4s. 10d. per lb.
Zinc Sulphide.—7½d. to 1s. 8d. per lb., according to quality

Pharmaceutical and Photographic Chemicals

The demand for Pharmaceutical Chemicals is better for export to the British Dominions than for the Home Trade.

Acid, Acetic 80% B.P.—£45 per ton.
Acid, Acetyl Salicylic.—3s. 2d. to 3s. 5d. according to quality. Good demand. Price firm.
Acid, Benzoic B.P.—3s. to 3s. 6d. per lb.
Acid, Boric B.P.—Crystal £51 per ton, Powder £55 per ton. Carriage paid any station in Great Britain.
Acid, Camphoric.—19s. to 21s. per lb.
Acid, Citric.—1s. 5½d. to 1s. 6d. per lb., less 5% for ton lots. Market very weak.
Acid, Gallic.—3s. per lb. for pure crystal.
Acid, Pyrogallic, Crystals.—6s. 9d. per lb. for 1 cwt. lots. Market firm. Increasing demand.
Acid, Salicylic.—1s. 6d. to 1s. 9d. per lb. Market unsettled and difficult.
Acid, Tannic B.P.—3s. per lb. Market quiet.
Acid, Tartaric.—1s. 1¾d. per lb., less 5%.
Amidol.—9s. per lb. d/d.
Acetanilide.—2s. 1d. to 2s. 3d. per lb. for quantity. Demand slow.
Amidopyrin.—13s. 3d. per lb. Neglected. Stocks low.
Ammonium Benzoate.—3s. 3d. to 3s. 6d. per lb. according to quantity.
Ammonium Carbonate B.P.—£37 per ton.
Atropine Sulphate.—12s. 6d. per oz. for English make.
Barbitone.—15s. to 15s. 6d. per lb. Quiet market.
Benzonaphthol.—5s. 3d. per lb. Small inquiry.
Bismuth Salts.—A steady market. Prices according to quantity.
Bismuth Carbonate.—12s. 9d. to 14s. 9d. per lb.
Bismuth Citrate.—11s. 4d. to 13s. 4d. per lb.
Bismuth Salicylate.—10s. 2d. to 12s. 2d. per lb.
Bismuth Subnitrate.—10s. 9d. to 12s. 9d. per lb.
Borax B.P.—Crystal £29, Powder £30 per ton. Carriage paid any station in Great Britain.
Bromides.—Potassium, 10d. per lb.; sodium, 11d. per lb.; ammonium, 1s. per lb. Unsettled. Spot supplies short, raw materials dearer, market advancing. Forward quotations equal to 1s. 3d. per lb. for potassium bromides, K.I.D. paid.
Calcium Lactate.—Demand active. Good English make can be had from 1s. 7d. to 2s. 6d. per lb.
Chloral Hydrate.—4s. to 4s. 3d. per lb. Very firm and scarce.
Chloroform.—2s. per lb. for cwt. lots. Very steady.
Creosote Carbonate.—6s. 6d. per lb. Little demand.
Formaldehyde.—£54 per ton, ex works. English make in casks. About 8s. per cwt. extra for carboys.
Glycerophosphates.—Fair business passing. Calcium, soluble and citrate free, 7s. per lb.; iron, 8s. 9d. per lb.; magnesium, 9s. per lb.; potassium, 50%, 3s. 6d. per lb.; sodium, 50%, 2s. 6d. per lb.
Guaiacol Carbonate.—10s. 6d. to 11s. 3d. per lb.
Hexamine.—3s. 6d. per lb. for English make. Market quiet and steady.
Homatropine Hydrobromide.—30s. per oz.
Hydrastine Hydrochloride.—English make offered at 120s. per oz.
Hydroquinone.—4s. 3d. per lb. in cwt. lots. Foreign make.
Hypophosphites.—Calcium, 3s. 6d. per lb. for 28 lb. lots; potassium, 4s. 1d. per lb.; sodium, 4s. per lb.
Iron Ammonium Citrate B.P.—2s. 1d. to 2s. 5d. per lb., according to quantity.
Magnesium Carbonate.—Light Commercial, £36 per ton net.
Magnesium Oxide.—Light Commercial, £75 per ton, less 2½%; Heavy Commercial, £26 per ton, less 2½%; Heavy Pure, 1s. 6d. to 2s. per lb., according to quantity. Steady market.
Menthol.—A.B.R. recrystallised B.P., 50s. per lb. Market better. Synthetic, 26s. to 35s. per lb., according to quantity. English make. Strong demand.
Mercurials.—Market flat. Red oxide, 5s. 3d. to 5s. 4d. per lb.; Corrosive sublimate, 3s. 6d. to 3s. 7d. per lb.; white precipitate, 4s. 7d. to 4s. 8d. per lb.; Calomel, 3s. 11d. to 4s. per lb.
Methyl Salicylate.—1s. 10d. to 2s. 3d. per lb. for carboys. Keen competition.
Methyl Sulphonel.—26s. per lb.
Metol.—11s. per lb. British make.
Morphine and Salts.—Reduced by 1s. to 1s. 3d. per oz.
Paraformaldehyde.—2s. 10½d. to 3s. per lb. Not very active.
Paraldehyde.—1s. 5d. to 1s. 6d. per lb. in free bottles and cases.
Phenacetin.—6s. to 6s. 3d. per lb. Price and demand steady.
Phenazone.—7s. 6d. A shade firmer. Forward prices higher.
Phenolphthalein.—6s. 6d. per lb. Ample supplies.
Potassium Bitartrate 99/100% (Cream of Tartar).—88s. per cwt. less 2½% for ton lots. Firm market. Prices have upward tendency.
Potassium Citrate.—1s. 10d. to 2s. 2d. per lb. Dearer.
Potassium Iodide.—16s. 8d. to 17s. 5d. per lb., according to quantity. Demand continues heavy..
Potassium Metabisulphite.—7½d. per lb., 1-cwt. kegs included.
Potassium Permanganate.—B.P. crystals, 6½d. per lb., carriage paid; commercial, 8d. to 8¼d. per lb., carriage paid. Keen competition keeps prices low.
Quinine Sulphate.—2s. 3d. per oz., in 100 oz. tins. Very heavy demand.
Resorcin.—5s. 6d. to 5s. 9d. per lb. Firmer. Scarce.
Saccharin.—63s. per lb. in 50-lb. lots.
Salol.—3s. 6d. to 3s. 11d. per lb.
Silver Proteinate.—9s. 6d. per lb.
Sodium Benzoate, B.P.—2s. 9d. per lb. Ample supplies B.P. quality available.
Sodium Citrate, B.P.C., 1923.—1s. 11d. to 2s. 2d. per lb., according to quantity.
Sodium Hypophosphite, Photographic.—£13 to £15 per ton. according to quantity, d/d. consignee's station in 1-cwt. kegs.
Sodium Metabisulphite Crystals.—37s. 6d. to 60s. per cwt., net cash, according to quantity.
Sodium Nitroprusside.—16s. per lb. Less for quantity.
Sodium Potassium Tartrate (Rochelle Salt).—75s. to 82s. 6d. per cwt., according to quantity. Market steady, good demand.
Sodium Salicylate.—Powder, 2s. 2d. to 2s. 4d. per lb. Crystal, 2s. 4d. to 2s. 6d. per lb. Flake, 2s. 9d. lb. Market more active.
Sodium Sulphide, pure recrystallised.—10d. to 1s. 2d. per lb., according to quantity.
Sodium Sulphite, anhydrous, £27 10s. to £28 10s. per ton, according to quantity, 1 cwt. kegs included. In large casks £1 per ton less.
Thymol.—19s. per lb. Very scarce indeed.

Perfumery Chemicals

Acetophenone.—12s. 6d. per lb.
Aubepine.—15s. 3d. per lb. Advanced.
Amyl Acetate.—2s. 9d. per lb.
Amyl Butyrate.—6s. 9d. per lb.
Amyl Salicylate.—3s. per lb.
Anethol (M.P. 21/22° C.).—4s. 6d. per lb.
Benzyl Acetate from Chlorine-free Benzyl Alcohol.—2s. 10½d. per lb.
Benzyl Alcohol free from Chlorine.—2s. 10½d. per lb.
Benzaldehyde free from Chlorine.—3s. 6d. per lb.
Benzyl Benzoate.—3s. 6d. per lb.
Cinnamic Aldehyde Natural.—16s. per lb. Advanced.
Coumarin.—20s. per lb.
Citronellol.—17s. per lb. Again advanced.
Citral.—9s. to 9s. 6d. per lb. Price reduction due to selling competition.
Ethyl Cinnamate.—13s. 6d. per lb. Cheaper.
Ethyl Phthalate.—3s. 3d. per lb.
Eugenol.—11s. per lb. Advanced.
Geraniol (Palmarosa).—35s. per lb.
Geraniol.—11s. to 18s. 6d. per lb.
Heliotropine.—7s. 9d. per lb. Advanced.
Iso Eugenol.—15s. 9d. per lb.
Linalol ex Bois de Rose.—26s. per lb.
Linalyl Acetate.—26s. per lb.
Methyl Anthranilate.—9s. 6d. per lb.
Methyl Benzoate.—6s. per lb.
Musk Ambrette.—45s. per lb. Cheaper.
Musk Xylol.—14s. per lb. Again cheaper.
Nerolin.—4s. 9d. per lb. Advanced.
Phenyl Ethyl Acetate.—15s. per lb. Advanced.
Phenyl Ethyl Alcohol.—16s. per lb.
Rhodinol.—57s. 6d. per lb.
Safrol.—1s. 10d. per lb.
Terpineol.—2s. 4d. per lb. Cheaper.
Vanillin.—26s. per lb.

Essential Oils

Almond Oil, Foreign S.P.A.—15s. 6d. per lb.
Anise Oil.—2s. 8d. per lb.
Bergamot Oil.—18s. per lb.
Bourbon Geranium Oil.—36s. 6d. per lb.
Camphor Oil.—75s. per cwt.
Cananga Oil, Java.—10s. 6d. per lb.
Cinnamon Oil, Leaf.—6½d. per oz.
Cassia Oil, 80/85%.—8s. 9d. per lb. Cheaper.
Citronella Oil.—Java, 85/90%, 5s. 8d. per lb. Cheaper. Ceylon, 3s. 7d. per lb.
Clove Oil.—7s. 6d. per lb. Firm.
Eucalyptus Oil, 70/75%.—2s. 1d. per lb. Price advanced on fair business.
Lavender Oil.—French 38/40% Esters, 30s. per lb. Very firm. Higher prices expected owing to bad crops.
Lemon Oil.—3s. per lb.
Lemongrass Oil.—3d. per oz.
Orange Oil, Sweet.—13s. per lb.
Otto of Rose Oil.—Bulgarian, 37s. 6d. per oz. Production below normal. Anatolian, 18s. per oz.
Palma Rosa Oil.—19s. per lb.
Peppermint Oil.—Wayne County, 21s. per lb. Firm spot and forward. Japanese, 14s. 3d per lb.
Petitgrain Oil.—9s. 3d. per lb. Cheaper.
Sandal Wood Oil.—Mysore, 26s. 6d. per lb. Australian, 21s. per lb.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.

Glasgow, August 14, 1924.

DURING the past week business in the heavy chemical market has been rather quieter. Numerous Continental offers continue to be received, and in a number of cases prices quoted are rather lower than last reported. Prices of home manufactured materials are steady.

Industrial Chemicals

ACID ACETIC.—Glacial, 98/100%, £58 to £60 per ton; 80%, pure, £45 to £48 per ton; 80%, technical, £43 10s. to £44 10s. per ton. All packed in casks, delivered c.i.f. U.K. port, duty free.

ACID BORACIC.—Crystal or granulated, £45 per ton; powdered, £47 per ton; carriage paid U.K. stations, minimum ton lots.

ACID CARBOLIC ICE CRYSTALS.—Quoted 6½d. per lb., delivered f.o.b. U.K. port.

ACID CITRIC, B.P. CRYSTALS.—Quoted 1s. 5½d. per lb., less 5% ex store, spot delivery. Offered for prompt shipment from the continent at 1s. 5d. per lb., less 5% c.i.f. U.K. port.

ACID FORMIC, 85%.—Unchanged at about £56 per ton, ex store, spot delivery. Offered from the continent at about £53 10s. per ton, ex wharf, prompt shipment.

ACID HYDROCHLORIC.—In little demand. Price 6s. 6d. per carboy, ex works.

ACID NITRIC, 80°.—£23 10s. per ton, ex station, full truck loads.

ACID OXALIC.—98/100%. Unchanged at about 4½d. per lb., ex store, offered from the continent at 3⅞d. per lb., c.i.f. U.K. port.

ACID SULPHURIC.—144°, £3 12s. 6d. per ton; 168°, £7 per ton, ex works; full truck loads. Dearsenicated quality, 20s. per ton more.

ACID TARTARIC, B.P. CRYSTALS.—Quoted 1s. 1½d. per lb., less 5%, ex store, spot delivery. Offered for forward delivery at about 1s. 1d. per lb., less 5%, ex wharf.

ALUMINA SULPHATE, 17/18% iron free. Spot lots quoted £8 per ton, ex store. Offered for prompt shipment from the continent at about £7 5s. per ton, c.i.f. U.K. port.

ALUM, CHROME.—Quoted £19 10s. to £21 10s. per ton, f.o.b. U.K. port, according to quality.

ALUM, POTASH CHROME ALUM.—Quoted £26 10s., ex store.

ALUM, LUMP POTASH ALUM.—Offered from the continent at about £8 7s. 6d. per ton, c.i.f. U.K. port. Spot lots quoted £9 10s. per ton, ex store. Lump potash alum of English manufacture quoted £9 7s. 6d. per ton, f.o.b. U.K. port for export.

AMMONIA ANHYDROUS.—Unchanged at about 1s. 6d. per lb., ex station. Containers extra and returnable.

AMMONIA CARBONATE.—Lump, £37 per ton; powdered, £39 per ton; packed in 5 cwt. casks, delivered U.K. port.

AMMONIA LIQUID, 880°.—In steady demand, unchanged at 2½d. to 3d. per lb., delivered, according to quantity. Containers extra.

AMMONIA MURIATE.—Grey galvanisers quality unchanged at £30 per ton ex station, fine white crystals of English manufacture quoted £37 per ton f.o.b. U.K. port, fine white crystals offered from the continent at £24 10s. per ton, c.i.f. U.K. port.

ARSENIC, WHITE POWDERED.—Spot lots unchanged at about £54 per ton ex store. Quoted £52 per ton f.o.b. U.K. port for export.

BARIUM CARBONATE, 98/100%.—Now on offer from the continent at £11 5s. per ton c.i.f. U.K. port.

BARIUM CHLORIDE, 98/100%.—Quoted £12 17s. 6d. per ton c.i.f. U.K. port for white crystals; crystal powder quoted £12 per ton c.i.f. U.K. port.

BARYTES.—Finest English white quoted £5 5s. per ton, ex works, continental about £5 per ton c.i.f. U.K. port.

BLEACHING POWDER.—Spot lots £11 per ton ex station, contracts 20s. per ton less.

BORAX.—Granulated, £24 10s. per ton; crystals, £25 per ton; powdered, £26 per ton carriage paid U.K. stations, minimum ton lots.

CALCIUM CHLORIDE.—English material unchanged at £5 12s. 6d. per ton ex station, continental slightly cheaper at £4 17s. 6d. per ton c.i.f. U.K. port.

COPPERAS, GREEN.—Unchanged at about £3 per ton ex works, packed in casks free.

COPPER SULPHATE.—Quoted £24 per ton f.o.b. U.K. port for export, continental material on offer at £23 5s. per ton ex quay.

FORMALDEHYDE, 40%.—Spot lots now available at £53 10s. per ton ex store, offered from America for prompt shipment at £50 10s. per ton c.i.f. U.K. port.

GLAUBER SALTS.—English material quoted £4 per ton ex store or station, continental on offer at about £3 17s. 6d. per ton ex store. Offered for early delivery at £3 10s. per ton c.i.f. U.K. port.

LEAD, RED.—Imported material now quoted £40 10s. per ton ex store, spot delivery.

LEAD, WHITE.—Quoted £43 per ton ex store, spot delivery.

LEAD, ACETATE.—Continental prices inclined to be higher. White crystals now quoted £46 per ton c.i.f. U.K. port, brown on offer at £41 10s. per ton c.i.f. U.K. port.

MAGNESITE CALCINED.—Unchanged at about £7 17s. 6d. per ton ex station, prompt delivery. Hard burnt quality quoted £4 15s. per ton ex station. Finer quality of continental manufacture quoted £7 15s. per ton c.i.f. U.K. port.

MAGNESIUM CHLORIDE.—Now quoted £3 15s. per ton c.i.f. U.K. port, prompt shipment, flake quality 10s. per ton extra.

POTASH CAUSTIC, 88/92%.—Quoted £27 15s. per ton c.i.f. U.K. port. Prompt shipment. Spot material available at £29 5s. per ton ex store.

POTASSIUM BICHROMATE.—Unchanged at 5½d. per lb., delivered.

POTASSIUM CARBONATE, 96/98%.—On offer from the continent at £22 10s. per ton c.i.f. U.K. port. Spot lots quoted £25 per ton ex store.

POTASSIUM CHLORATE.—Unchanged at 2¾d. per lb. ex store.

POTASSIUM NITRATE (SALTAETRE).—Offered from the continent at £25 15s. per ton c.i.f. U.K. port. Spot lots available £29 per ton ex store.

POTASSIUM PERMANGANATE, B.P. CRYSTALS.—Unchanged at about 8¼d. per lb., ex store, spot delivery. Offered from the continent at 7¾d. per lb. c.i.f. U.K. port.

POTASSIUM PRUSSIATE (YELLOW).—Quoted 7¼d. to 7½d. per lb., ex store.

SODIUM CAUSTIC.—76/77%, £19 7s. 6d. per ton; 70/72%, £17 17s. 6d. per ton; 60/62%, broken, £19 2s. 6d. per ton; 98/99%, powdered, £22 15s. per ton. All ex station, spot delivery. Contracts 20s. per ton less.

SODIUM ACETATE.—Spot lots unchanged at £23 15s. per ton, ex store. Offered from the continent at about £22 10s. per ton c.i.f. U.K. port.

SODIUM BICARBONATE.—Refined recrystallised quality, £10 10s. per ton, ex quay or station. M.W. quality, 30s. per ton less.

SODIUM BICHROMATE.—English material unchanged at 4¼d. per lb. delivered. American on offer at slightly less, c.i.f. British ports.

SODIUM CARBONATE.—Soda crystals, £5 to £5 5s. per ton ex quay or station; alkali 58%, £8 12s. 3d. per ton ex quay or station.

SODIUM HYPOSULPHITE.—English material unchanged at about £10 per ton ex station, continental on offer at about £8 7s. 6d. per ton c.i.f. U.K. ports, spot lots available at about £9 15s. per ton ex store, pea crystals of English manufacture quoted £13 15s. per ton ex station.

SODIUM NITRATE.—Ordinary quality unchanged at £13 10s. per ton ex store, 96/98% refined quality, 7s. 6d. per ton extra.

SODIUM NITRITE.—100%, unchanged at £26 5s. per ton ex store, spot delivery.

SODIUM PRUSSIATE (YELLOW).—In little demand. Quoted 4¼d. per lb. ex station or f.o.b. U.K. port.

SODIUM SULPHATE (SALTCAKE).—Price for home consumption £13 10s. per ton carriage paid buyers' station. Good inquiry for export and price about £3 per ton f.o.b. U.K. port.

SODIUM SULPHIDE.—60/65% solid, of English manufacture, £14 15s. per ton ex station; broken, £1 per ton more; flake, £2 per ton more; 60/62%, solid, offered from the continent at £12 per ton c.i.f. U.K. port; broken, £1 per ton more; 31/34%, crystals, of English manufacture. £9 2s. 6d. per ton ex station; 30/32% crystals, offered from the continent at £8 7s. 6d. per ton c.i.f. U.K. port.

SULPHUR.—Flowers, £9 10s. per ton; roll, £8 10s. per ton; rock, £8 7s. 6d. per ton; ground, £8 5s. per ton. Ex store. Prices nominal.

ZINC CHLORIDE.—98/100%, solid, offered from the continent at about £24 5s. per ton c.i.f. U.K. port; 96/98% quoted £23 10s. per ton c.i.f. U.K. port; English material for export about £27 5s. per ton f.o.b. U.K. port.

ZINC SULPHATE.—Continental material quoted £10 15s. per ton c.i.f. U.K. port, English material on offer at about £13 5s. per ton ex station.

NOTE.—The above prices are for bulk business and are not to be taken as applicable to small parcels.

Coal Tar Intermediates and Wood Distillation Products

H. Acid.—Good home inquiry. Price quoted 4s. 2d. per lb., 100% basis. Carriage paid.

Sulphanilic Acid.—Inquiry for export, quoted 9¼d. per lb., 100% basis, packages included.

Dinitro Benzol.—Export inquiry. Price 10d. per lb. f.o.b., casks included.

Dimethyl Aniline.—Export inquiry, quoted 2s. 3d. per lb. f.o.b., drums included.

Benzyl Chloride.—Some export inquiry. Offered at 1s. 5d. per lb. f.o.b. buyer's packages.

Gamma Acid.—Some home inquiry. Offered at 10s. 3d. per lb., 100% basis, carriage paid, packages inclusive.

Phenyl Peri Acid.—Inquiry for export. Offered at 5s. 7d. per lb., 100% basis, f.o.b., casks free.

Dinitrotoluene.—Some home inquiry. Price quoted 10d. per lb., delivered works, packages free.

Para Nitraniline Sulphonate.—Some inquiry for export. Offered at 4s. 10d. per lb., 100% basis, f.o.b., casks included.

Metanilic Acid.—Fair inquiry for export. Offered at 3s. per lb., 100% basis, f.o.b., casks included.

Xylidine.—Fair inquiry for export. Price 1s. 11d. per lb., f.o.b., drums included.

Para Amidophenol Base Technical.—Export inquiry. Offered at 7s. 11d. per lb., 100% basis, f.o.b., casks included.

Para Amidophenol Hydrochloride Technical.—Export inquiry. Price quoted 7s. 10d. per lb., 100% basis, f.o.b., casks included.

Alpha Naphthol.—Some export inquiry. Quoted 2s. 5d. per lb., f.o.b., casks included.

Diphenylamine.—Good inquiry for export. Price 2s. 10d. per lb., f.o.b., casks included.

The Manchester Chemical Market

(From Our Own Correspondent.)

Manchester, August 14, 1924.

The prevailing quietness of the chemical market here has been rather accentuated by the holiday season and there can be little hope of better conditions until this month is out, at all events. Business can best be described as "scrappy," transactions as before being largely confined to small parcels for near delivery. Orders for shipment continue on moderate lines, most of the export trade being on colonial account. For the most part quotations during the past week have been maintained at recent levels, but in several lines a further slight easing of values has occurred.

Heavy Chemicals

Glauber salts continue to sell only in moderate quantities, although values are unchanged at £3 10s. per ton. Sulphide of sodium is not attracting a great deal of buying interest; quotations are about the same as last week but they lack firmness, 60–65 per cent. concentrated solid offering at about £14 per ton and crystals at £9 10s. Hyposulphite of soda is quiet but fairly steady at £14 5s. per ton for photographic crystals and £9 7s. 6d. for commercial. Salt-cake is inactive at £3 to £3 10s. per ton. Caustic soda meets with a fair demand for both branches of trade and values are steady, ranging from £16 17s. 6d. for 60 per cent. to £19 7s. 6d. for 76–77 per cent. material. Prussiate of soda is only in small inquiry at round 4d. per lb. Bleaching powder is steady and in moderate request at £10 per ton. Chlorate of soda is still quoted at 2½d. to 2¾d. per lb., demand being of moderate dimensions. Alkali is selling in fair quantities both to home users and for shipment, quotations being maintained at £6 15s. per ton. Phosphate of soda is quiet but unchanged at £13 10s. per ton. Bicarbonate of soda is still quoted at £10 10s. per ton, a quietly steady volume of business being put through. Bichromate of soda is in fair demand at 4¼d. per lb. Soda crystals keep quiet at £5 5s. per ton. Acetate of soda is now quoted at round £23 per ton, but sales are slow.

Caustic potash is steadier again, a slightly better tone having been noted recently; 90 per cent. strength is quoted at £28 10s. per ton. Carbonate of potash, however, is unchanged either in position or value, quotations being easy at £22 10s. to £23 per ton. Bichromate of potash is steady but only in moderate demand at 5½d. per lb. Permanganate of potash is fairly active and prices are fully maintained at 7¼d. to 8d. per lb. Yellow prussiate of potash is offering at round 7¼d. per lb., but the position of this material continues dull. Chlorate of potash is in moderate request at 2¾d. per lb.

Little change in the general position of arsenic can be reported this week; the demand is still very restricted, though no quotable alteration of price since last report has occurred, white powdered, Cornish make, standing at about £48 per ton in Manchester. Sulphate of copper keeps quiet and values are easy, £24 to £24 10s. per ton, f.o.b., being the current quotation. Commercial Epsom salts are maintained at about £4 15s. per ton, with magnesium sulphate, B.P. quality, on offer at £6 10s. Nitrate of lead is dull and easy at £41 to £42 per ton. Acetate of lead is also weaker and not much business is being done; white is quoted at about £45 10s. and brown at £44 per ton. Grey acetate of lime attracts little attention and values now range from £16 to £17 per ton, with brown quoted at about £11 15s.

Acids and Tar Products

Acids are in much the same position as last week. Tartaric is quiet at about 1s. 1d. per lb., with citric still quoted at 1s. 5d. to 1s. 5½d. Oxalic acid is featureless at round 4¼d. per lb. Acetic acid is easy and quieter; 80 per cent. technical is round £43 per ton and glacial at £68.

The coal-tar products are generally inactive. Pitch is quiet at about £3 per ton. Carbolic acid is dull and weak at 6¼d. per lb. for crystal and 1s. 9d. to 2s. per gallon for crude. Creosote oil is in fair inquiry at 5¾d. per gallon. Solvent naphtha attracts little attention and values are weak at 1s. 3d. to 1s. 4d. per gallon. Naphthalenes are quiet at £16 to £17 per ton for refined and from £5 per ton for crude material.

Company News

Goodlass, Wall and Co.—A dividend of 2s. 6d. per share for the year is recommended.

Consett Spanish Ore Co.—For the year to June 30 last, the nett revenue was £4,931 making available £5,520. A final dividend of 5 per cent. is proposed, making 10 per cent. for the year.

Broken Hill Proprietary Co., Ltd.—The nett profit for the year to May 31 last is stated to be £279,339, after providing £156,153 for ordinary depreciation and £142,965 special depreciation and £121,546 debenture interest.

Old Silkstone Collieries Co.—The profits of this company, who now own the whole of the share capital of the old Silkstone Chemical Works, amounted to £70,807, for the year ended March 31. For the previous year the profits were £56,743.

Bradford Dyers' Association, Ltd.—At the annual meeting held on Monday the directors declared an interim dividend for the year to December 31 next on the ordinary shares at the rate of 1s. per share, less tax, the same as a year ago. The dividend warrants will be posted on September 1.

Powell Duffryn Steam Coal Co., Ltd.—The following interim dividends have been declared in respect of the current year, payable to the shareholders on September 9 next; 5 per cent. actual on the ordinary shares, free of tax; 3 per cent. actual on the preference shares, less tax; and 3 per cent. actual on the second preference shares, less tax, being in each case the same as a year ago.

Centrifugal Separators, Ltd.—At the annual meeting held on August 8, the chairman, in moving the adoption of the report, said that at the last meeting he referred to certain experiments which at that time were being carried out with the Gee machine in one of the large industries of the country. The directors regretted very much that shortly after the meeting the experiments referred to were suspended, not owing, they were advised, to inefficiency of the machine, but to the decision of the customer in question not to spend the money which would have been involved in continuing the experiments, and thus the field which it was hoped would be opened had so far remained closed. The directors, however, were still hopeful that the experiments would be resumed. Referring to the new separator mentioned last year, the chairman said that the number of machines sold during the eight months they had been on the market was regarded as most encouraging, and they had in every case given entire satisfaction to the customers.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that occur.

County Court Judgments

[NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.]

BOOTH (JAMES) AND CO., Montford Road, Sheffield, oil and grease merchants. (C.C., 16/8/24.) £15 15s. 6d. June 16.

HOPKINS, Ernest Martin, 40, North Road, Clayton, Manchester, dyers' chemist. (C.C., 16/8/24.) £17 0s. 10d. July 8.

LONDON CHEMICAL CO., Scotts Road, Southall, chemical manufacturers. (C.C., 16/8/24.) £30 12s. 9d. April 14.

TATHAM, G. H., 46, Davenport Road, Catford, S.E., analytical chemist. (C.C., 16/8/24.) £16 6s. 2d. July 8.

Mortgages and Charges

*[NOTE.—The Companies Consolidation Act, of 1908, provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.]*

BERRITE, LTD., Hayes, varnish makers. (M., 16/8/24.) Registered July 29, £2,700 and further advances, mortgage, to A. F. Berry, 50, Oxford Street, W.; charged on Hillingdon Varnish Works, Yiewsley, also general charge. *Nil. December 18, 1923.

LAWS, STRACEY AND DYMOND, LTD., Watford, chemists. (M., 16/8/24.) Registered August 1, £2,500 mortgage and charge, to Miss J. S. Wilde, 35, Cliveden Road, Wimbledon; charged on property at Rickmansworth Road, Watford, also general charge. *Nil. July 16, 1923.

THAMES CHEMICAL CO., LTD., Watford. (M., 16/8/24.) Registered August 1, £2,500 debenture, to Miss J. S. Wilde, 35, Cliveden Road, Wimbledon; general charge. *£3,000. January 2, 1924. NOTE.—See also Satisfaction.

Satisfaction

THAMES CHEMICAL CO., LTD., Watford. (M.S., 16/8/24.) Satisfaction registered August 2, £3,000 registered August 4, 1923.

London Gazette

Company Winding Up Voluntarily

AINLEY AND CO., LTD. (C.W.U.V., 16/8/24.) G. A. Marriott, 9, Albert Square, Manchester, Incorporated Accountant, appointed liquidator.

Notice of Dividend

WOOD, Arthur, Grenville, Bramhall Lane, Stockport, Chester, formerly manufacturing chemist. First and final dividend, 20s. per £, payable August 20, Official Receiver's Office, Byrom Street, Manchester.

New Companies Registered

DUERDIN AND SAINSBURY, LTD., incorporated in Melbourne, Australia, on June 29, 1920. The British address is at 61, Broad Street House, 11, Blomfield Street, London, E.C. Manufacturing chemists and druggists. Nominal capital, £250,000 in £1 shares (75,000 8 per cent. cum. preference and 175,000 ord.).

NYROP DEHYDRATOR, LTD., 5, Grosvenor Gardens, London, S.W.1. Research chemists, chemical manufacturers and general engineers in all its branches, etc. Nominal capital, £4,000 in 3,000 10 per cent. preferred ordinary shares of £1 and 5,000 deferred shares of 4s.

POWLING'S PROCESSES, LTD., 6, Billiter Street, London, E.C.2. To acquire, use, exercise and vend any inventions relating to the treatment or extraction of fats, bones and other similar inventions. Nominal capital, £1,000 in £1 shares (500 preference and 500 ordinary).

RANSOLEUM, LTD., 7, Brazennose Street, Manchester. Manufacturers, refiners of, agents for or dealers in oils, fats, and greases, soap, chemicals, including manures, bones, slags, etc. Nominal capital, £1,000 in £1 shares.

STAR REFINERIES, LTD., 7, Brazennose Street, Manchester. Manufacturers and refiners of, agents for or dealers in all kinds of oils, fats and greases, both edible, inedible, etc. Nominal capital, £2,000 in £1 shares.

TILDESLEY, LTD. Chemists, druggists, chemical manufacturers and dealers, drysalters, etc. Nominal capital, £1,000 in £1 shares. Solicitors: Miles, Hutchinson and Lithgow, 85, Albert Road, Middlesbrough.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

AGENTS' SERVICES OFFERED.—A firm of commission and customs clearing agents desires to get into touch with British manufacturers of chemicals, paints and varnishes and linseed oil. (Reference No. 170.)

STEAM TURBO-CENTRIFUGAL PUMP WITH CONDENSER.—H.M. Senior Trade Commissioner in South Africa reports that the Rand Water Board are calling for tenders for the supply, delivery and erection of one steam turbo-centrifugal pump with condenser, piping and all accessories (Contract No. 259.) British firms in a position to supply British materials can obtain further particulars of this call for tenders. (Reference No. A.X./1230.)

CEMENT FOR MEXICO.—A merchant house of Tampico is desirous of establishing business relations with British firms exporting cement, caustic soda, etc. (Reference No. 213.)

INDUSTRIAL CHEMICAL PRODUCTS, BELGIUM.—An agent, established at Liége, is desirous of obtaining the representation of British manufacturers, on a commission basis, for the sale in Belgium of all medical, pharmaceutical and druggists' supplies and industrial chemical products. (Reference No. 189.)

LUBRICATING OILS.—Tenders for supply of lubricating oils for six months are invited to be sent to the Town Clerk, Municipal Offices, Andover.

Customs Evasion—Heavy Fine

HERBERT LOWERY, commercial traveller, of 29, Alliance Avenue, Hull, was charged at Hull, on August 8, under the Customs Consolidation Act, with "harbouring" 125 lb. of saccharine, and with carrying 4 lb. of saccharine on which duty had not been paid. He pleaded guilty.

It was stated that defendant was liable to pay treble value and duty of the saccharine, which would amount in all to £1,483 15s. 6d. The actual value of the saccharine was 15s. a lb., and the duty upon it was £3 a lb. Defendant in a written statement admitted that he had sold the saccharine at 5s. a lb. below the market price. In the first case a penalty of £922 10s., or three months' imprisonment, was imposed, and in the second case defendant was fined £25, or six weeks' imprisonment. The saccharine was also forfeited. The magistrates agreed to allow the defendant to pay £250 down and the remainder in three equal monthly instalments.